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For my
W. A. Holmes

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Holmes Anniversary Volume

Anthropological Essays

Presented to

William Henry Holmes

In Honor of his Seventieth Birthday, December 1, 1916

By

His Friends and Colaborers



Washington
1916



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APPRECIATION

Dear Mr Holmes:

Because you wear "the rose of youth" upon you, we need not accept literally in your case the song of the Psalmist that "the days of our years are three-score years and ten," for we, your friends and colaborers in the field of Anthropology, are inclined to feel that you have found the Fountain of Youth from which flow the streams of inspiration and joy so manifest in your daily work.

This volume, therefore, must not be regarded as merely commemorative of the day on which you achieve the seventieth milestone in your journey of life. It is rather an epitome of the influence you have exerted on others through the passing years, a testimonial of your masterly leadership in both Science and Art. You are still at the height of your remarkable activity. At no time in your career have you done more noteworthy work in the advancement of knowledge than you are doing now. So with your splendid reserve of force, and with the inspiration derived from the important results of a generation of research in American Archeology, we hope and expect you will continue to bestow upon us the influence of that experience for years to come.

Accept then, this book, not as a measure of our indebtedness for what you have already accomplished, but as a token of our affection, our appreciation, and high esteem.

F. W. H.

WASHINGTON

December 1, 1916

Pomo Buildings¹

By S. A. BARRETT



THE Pomo Indians of California occupied a region embracing, as has elsewhere² been outlined, three distinct environmental areas: the "redwood belt" along the immediate coast line, the open, grassy "valley region" in the Russian and Eel river drainages, and the "lake region" lying about Clear lake and the other rush-bordered lakes of that vicinity.

DWELLINGS

The influence of these three environments on Pomo culture is well shown in the distant type of dwelling³ found in each area.

The usual dwelling of the redwood belt was built of slabs of redwood bark and wood split out with the elk-horn wedge and usually leaned together against a center-pole, or sometimes without it, to form a conical structure, called *tca'kawen* (*N*). Owing to the nature of the materials, such a house was fairly small, varying from eight to about twelve feet in diameter and from six to eight feet in height. Figures 1 and 2 of plate I show two of these slab houses photographed in 1902. Of these the latter is more typical. The former is made almost entirely of ordinary lumber. As is well shown in figure 2 of this plate, these slabs are so placed as to leave an opening of sufficient size at the top to permit the ready escape of smoke. The door was formed by omitting one or more slabs from one side; this was closed when desired by setting in the necessary slabs to fill it.

A long, wedge-shaped slab house was made also in this area, though this type has long since passed out of use. Nothing in the

¹ The information on which this paper is based was collected largely during the years 1903 and 1904 as part of the work of the Ethnological and Archaeological Survey of California, conducted by the Department of Anthropology of the University of California through the munificence of Mrs Phoebe A. Hearst. Part of it was gathered during twelve years of residence in the Pomo region prior to that time. All the photographs used as illustrations were made by the author in 1901 and 1902. Most of the buildings shown are types which are no longer built by the Pomo.

² The Ethno-Geography of the Pomo and Neighboring Indians, *Univ. Calif. Publ., Amer. Arch. Ethn.*, VI, 22-27, 1908. The alphabet used in the paper cited (pp. 51-54) is employed in recording the Indian terms in the following pages, except that the voiceless dental stop is here represented by *t* instead of *t*.

Also native terms are followed by a parenthetical initial indicating the dialect to which each belongs, viz.: *N*, Northern; *C*, Central; *E*, Eastern; *S*, Southern; and *SE*, Southeastern.

³ The general features of these three types of dwellings are outlined in the paper above mentioned, but a more detailed discussion, with illustrations, is here undertaken.

HOLMES ANNIVERSARY VOLUME

form of a square board house was ever made in aboriginal times, though the modern board house copied from the white man has completely replaced all forms of aboriginal house throughout the Pomo region.

In the valley region the houses were usually circular or rectangular in ground-plan, though sometimes they took the form of an L. A framework of poles was first erected. The vertical poles were placed firmly in the ground about a foot and a half or two feet apart, brought together at the top, and, in the elliptical house, firmly bound along a horizontal ridge-pole which was usually about half the length of the house. On the outside of these, horizontal poles were bound from about fifteen to eighteen inches apart, each crossing of a horizontal and a vertical pole being firmly bound together with withes or grape-vine. Upon this framework was laid, course upon course, a thatch of long grass, each course being held in place by a horizontal pole which was covered by the lower edge of the next higher course of thatch. This presented to the weather an even and thoroughly waterproof surface. A slot, perhaps six inches wide and about the length of the ridge-pole, was left unthatched and served as an outlet for the smoke. This was the regular winter grass house, called *kadi'tca* (C, S). It was watertight and warm, but must ordinarily be rebuilt each season. Informants also stated that a fairly small, conical grass house, called *i'tsulu'lutc* (C), was formerly made in the valley region.

None of these grass-thatched houses has been used for many years, and unfortunately it has been impossible to secure any actual photographs. Powers¹ shows a drawing of the L-shaped grass house. In speaking of the division of the Pomo which he calls the "Gallinomero", he says: "The remnant of them now living a little way below Healdsburg occupy one great wigwam, Ventura with his subjects, twenty or thirty together, on the most democratic equality. This wigwam is in the shape of the capital letter L, made up of slats leaned up to a ridge-pole, and heavily thatched. All along the middle of it the different families or generations have their fires, while they sleep next the walls, lying on the ground underneath rabbit-skin and other less elegant robes, and amid a filthy clutter of baskets, dogs, large conical-shaped baskets of acorns stacked one upon the other, and all the wretched trumpery dear to the aboriginal heart. There are three narrow holes for doors, one at either end and one at the elbow."

This was a survival of the communal house which was quite frequently found, at least in the valley and the lake regions, and which

¹ *Contr. N. A. Ethn.*, III, 1877, p. 175 and fig. 20.



1. CONICAL SLAB HOUSE AND A MODERN LOG HOUSE
2. CONICAL SLAB HOUSE TYPICAL OF THE "REDWOOD BELT" ALONG THE
IMMEDIATE COAST-LINE OF THE POMO REGION

BARRETT—POMO BUILDINGS

housed several families, usually quite closely related. Each two families ordinarily had an independent door and fire, while a single baking-pit sufficed for all. No partitions were used. One informant described an elliptical, tule house of this kind in which he lived at Mama'mamaū when a boy. This house, which was about twenty by forty feet in dimensions, had five fires and five doors, and sat on a knoll which projected out into Tule lake. Figure 1 shows a ground-plan of this house made from a drawing by the informant. The positions are as follows:

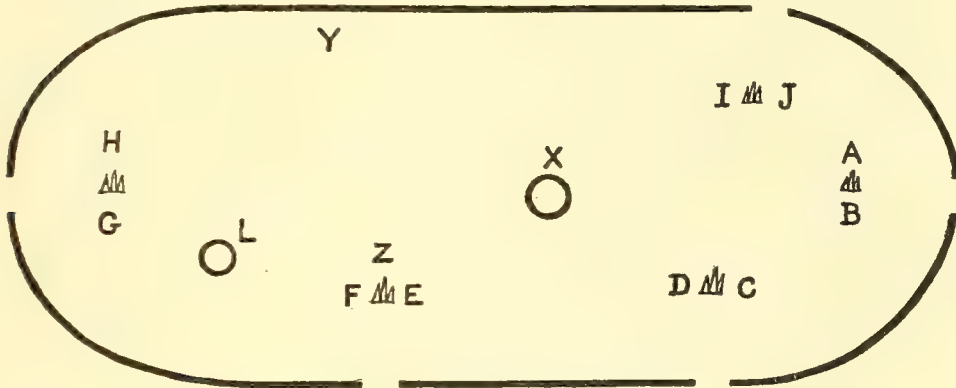


FIG. 1.—Ground-plan of a tule-thatched communal house.

- A, Position of the informant and his "grandfather" (i.e. his mother's father's uncle).
- B, Informant's mother and stepfather.
- C, Informant's grandfather's stepdaughter and husband.
- D, An old couple, distantly related to the informant.
- E, An old man and a boy.
- F, Informant's grandfather and wife.
- G, A distant relative of the informant, his wife, and daughter.
- H, An old couple.
- I, An old couple, relatives of the informant's grandfather's wife.
- J, A young couple, also relatives of the informant's grandfather's wife.

Each of the fires was about four feet from the door, and the wood was stored, usually on end, just outside the door, though a small amount for immediate use was kept near the fire, as at Z, or some other equally convenient point within the house. The large space (Y) was used for the storage of bulky things, such as acorn storage baskets, dried fish, basketry materials, and other articles requiring much space. A considerable supply of food, particularly of the more choice kinds, and all personal effects, were kept near the wall by their owner's fire.

HOLMES ANNIVERSARY VOLUME

The baking-pit was centrally located at x, directly under the smoke slot, since a big fire was required in baking bread, meat, or fish. As a rule the baking was done by the women of the house jointly and the bread shared by all. Between bakings this central space was used as a general storage place or for any other purpose desired. This was not suitable for permanent storage, however, on account of the leak through the smoke slot during a heavy storm. The one mortar stone of this house was permanently located at L, and was covered, when not in use, with an old mat. The inmates slept each near his own fire, the children sleeping behind their elders, thus saving covers. Small trenches were hollowed in the ground to fit the body to a certain extent. In each was placed a small amount of soft tule or grass over which was spread a sleeping mat.¹ Upon this bed a person usually slept naked and protected only by a rabbit-skin blanket or other covering, though as a rule the part of the body toward the fire was exposed directly to its warmth.

In the dry summer many of the Indians camped temporarily near the larger streams and lakes, or moved about, to a limited extent, in hunting and in search of certain bulbs, seeds, and other vegetal foods and medicines. As temporary summer homes they built simple brush shelters called *balo'ttca* (N), and *xa'iga* (E). These were of various forms, such as the very crude shelter shown in plate II, figure 2, and built by a very old couple on the bank of Russian river in Ukiah valley. A more carefully constructed brush house is the one shown in plate III, figure 2. This was built very much as was the grass-thatched house.

The brush-covered sun shelter, or canopy, called *see'tca* (SE), consists of four posts, about seven feet high, set vertically in the ground at from eight to fifteen feet apart. These support horizontal poles which hold the green boughs serving as a canopy. Such a shelter is even yet erected near almost any type of dwelling and serves as a working and lounging place for the family. Having no sides, the breezes blow freely through it and its shade contributes greatly to the comfort of its occupants.

The lake region is characterized by its great quantities of rush or tule. Three species are used in house building. One is *Scirpus lacustris* var. *occidentalis*, called *bagō'* (E); another is *Scirpus robustus*, called *gūca'l* (E); and the third is the cat-tail rush, *Typha latifolia*, called *hal* (E). The first, and least desirable for thatching purposes, has stems which are circular in cross-section, while the stem of the

¹ No raised bed was used by the Pomo, though myths mention its use among the bird people, before the creation of human beings.



1. ACORN CACHE THATCHED WITH TULE AND BRUSH AND COVERED
WITH CLOTH

2. WICKIUP OF IRREGULAR SHAPE



1. SIDE VIEW OF TULE HOUSE SHOWING THE DOOR
2. BRUSH SHELTER WITH DOME-SHAPED ROOF

BARRETT—POMO BUILDINGS

second has a triangular cross-section. These two species served not only as thatch but also as the materials for the mats with which the inner walls were lined, and which were used also as beds, as floor mats, and for various other household purposes. The third species was used for thatch only.

This tule-thatched house was usually elliptical or circular in ground-plan and had a dome-shaped roof. Its framework was built in the same manner as was that of the grass-thatched house just described, and the tule was applied and attached in about the same way. It was first made up into small bundles and several of these were sometimes very loosely held at their butt-ends by a single course of plain-twining with tule. Along the ridge-pole was also a smoke hole or slit, called *kasa'hwil* (*E*), similar to that of the brush house. In plates III, I, and IV, I, are two views of a typical tule house, photographed in 1902 near Bartlett Landing on the eastern shore of Clear lake. The first shows a view of the long, front side of the house, with its low door set in the middle; the other an end view of the same structure: both illustrate the method of tying the tule into bundles and also the method of binding with poles the four courses forming the thatch. The tying of these bundles shows in these pictures near the ground. In this instance, the butt-ends of some of the stems in the lowest course have been placed near the ground, though, as a rule, particularly in the upper courses of the thatch, these butt-ends were placed upward. This house was situated on a bench on the northern slope of one of the foothills overlooking Clear lake, and was placed with its longer axis east and west. Its dimensions were thirty-four by fourteen feet and its height was about twelve feet. The ridge-pole was twenty-five feet long. The framework consisted of eighty vertically placed poles, forming forty arches, *katō' coko'tī* (*E*), spaced from twelve to fifteen inches apart, and each bound to the ridge-pole. They were also bound to seven rows of horizontal poles, called *coko'tī* (*E*), so placed from bottom to top of the framework as to give equal spaces between each successive row. Thus, the whole framework had openings about a foot to eighteen inches square, and was very firm and rigid. The thatch consisted of bundles of *Scirpus robustus* laid on in four courses, and was from six to ten inches thick. The butts of the stems were placed uppermost, except as above noted, and each course overlapped the one below about a foot, thus producing a very smooth and even exterior surface. A smoke slit about a foot wide and perhaps twenty feet long was left along the ridge-pole. The door, which was in the middle of the northern side of this house, was about three feet wide and three and a half feet high. Such a house took its

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name from the particular species of tule predominating in its thatch, as follows: *bago'ga* (E), *gūca'l ga* (E), and *ha'l ga* (E).

The door, called *hwa* (E) and *hō'daū*¹ (C), of such a house was ordinarily placed in the middle of the long side opposite that from which the prevailing winds came and was so low that it was necessary to stoop far down or even to crawl on the hands and knees to enter. It could, however, be placed anywhere, and in houses with several doors one or more was usually on the windward side. During storms such a door was closed most of the time; the closed door was called *hwa dūla'm* (E). The open door was called *hwa dūta'm* (E), while the door opening itself was called *hwa mō'k* (E) or *hwa da'i* (E). The door was closed by means of an ordinary tule mat hung within, and a heavy outer door made of bundles of tule. These bundles were from two to three inches in diameter and served as the warp with ordinary single strands of tule used as weft in a plain-twining. It was set with these bundles standing vertically and effectually closed the opening from the outside. This outer door, especially in the valley area, was sometimes similarly woven of willow withes, or the stems of a weed called *mūti'p* (E) and *mī'p* (C). Either the inner or the outer mat was called *hwa dūla'm kale* (E) and *hōdaū cku'n kale* (C), both of which signify literally "door shut kind or object". The inner mat was called also *bitsa'ū* (E).

The house above described sheltered eight people. They slept at the two ends, where the walks were lined with mats to protect them from drafts. At the western end, for instance, there were six mats forming a lining six feet high and about twenty feet long about the wall.

The earth floor, *sema'gai* (E), was usually strewn with loose tule or grass and at least in part was covered with tule mats. The fire-place, *xo'gai* (E), was directly upon the floor in the center of the house and under the smoke slit.

Both tule- and grass-thatched houses were quite insecure from fire, especially on account of the fact that the soot from the open fires sometimes hung in strings from the ceiling, though as a rule these were kept brushed off with a special broom made of snowdrop twigs tied to the end of a pole. Fire usually spread very rapidly from one house to the next, so that ordinarily the whole village was quickly consumed. So inflammable were these materials that no attempt was made to save a house; all efforts were bent toward saving its contents, for a new house could be easily constructed. In the lake region, if it were found necessary to construct a house during a

¹ Literally "fire door".



1. END VIEW OF TULE HOUSE
2. ACORN CACHE THATCHED WITH TULE



1. EXTERIOR OF SUDATORY
2. INTERIOR OF SUDATORY

BARRETT—POMO BUILDINGS

season when the tule was not sufficiently ripe for the purpose, grass was used instead. An ordinary fire was taken with resignation, but a person guilty of incendiarism was severely dealt with by the rest of the people of the burned village.

Men of means, such as chiefs, good hunters, lucky gamblers, medicine-men and others, often had semi-subterranean, earth-covered lodges¹ similar in every respect to the sweat and dance houses shortly to be described, except that the pit was only about a foot and a half deep and the tunnel only about four feet long. These lodges were called *ga'hmarak* (*E*) and *ma'cane* (*C*). Frequently a small room was built out on either side of the tunnel as a storage place for wood. The roof was constructed with much care. Its frame of poles was covered with brush, grass, and matting, and finally with a layer of three or four inches of earth. Over this was plastered a layer of clay, any kind except white or blue being used. It was mixed in baskets and poured on from the top downward, being spread and patted into place by means of flat, wooden paddles, finally being smoothed very carefully with water. At last a thin layer of sand was applied to prevent cracking.² A man wealthy enough to afford one of these houses engaged others to build it, and custom prescribed that he pay liberally for the service.

If a house of any kind became infested with vermin, it was simply abandoned, but not destroyed, and a new house was built at a short distance from it.

The houses of a village were usually not arranged in any regular order. Often four or five houses were ranged in a row governed by the contour of the village-site, but there was no regularity in the relative positions of the rows.

THE ACORN CACHE

Another structure which resembled a dwelling was the cache, built of tule, for storing acorns and seeds. It appears never to have been used by the Pomo outside of the lake region, though a cache of different type was used in other parts of the Pomo country. It was somewhat circular or elliptical in ground-plan, though square or rect-

¹ Professor Holmes, in his "Anthropological Studies in California" (*Rep. U. S. Nat. Mus.*, 1900), shows three drawings (plate 17, figs. 3-5) of what he terms an "hibernia for women", which is quite different from the earth lodge here described. This was not mentioned by informants, though no specific inquiries were made concerning such a structure.

² This reversed the method of making the roof of the dance or sweat house, where the layer of clay was directly applied to the thatch and was then covered with a heavy layer of ordinary earth. Possibly the informant's memory may have failed in this particular, though he was very specific in his statement that the clay layer was applied over the ordinary earth in this instance.

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angular at the base, and always had a dome-shaped roof. It was built as follows: First from four to eight posts were firmly planted in the ground, extending up to a height of perhaps six feet. At a height of about two feet from the ground horizontal stringers were bound to the sides of these posts. Upon these the closely set poles which formed the floor were supported. It was very necessary that this floor be substantial, since it must support perhaps as much as a ton of acorns. Upon this floor, and within a fairly light framework of poles carefully bound together and to the heavy corner posts, the sides of the cache were built up of light twigs and weeds, this being finally lined with fine grass. Its interior when finished was not unlike that of a bird's nest. The curving top only was finally covered with a thatch of tule, and, when finished, the entire structure looked very similar to a small, tule house set up on piles. The thatch overhung slightly so that the water dripped from its edges directly to the ground. The sides therefore needed no special covering, as they were thick enough to prevent the driving rains from penetrating enough to do damage. It was filled with acorns before the roof was put on, and had no regular door; in fact, a door was unnecessary for the removal of the acorns. The loosely constructed sides, being without wattling or other form of weaving, were easily opened at any desired point by simply pulling the twigs, weeds, and grass apart, since only a small aperture allowed the acorns to run out into a basket set below. The twigs, etc., were then pulled back into place and adjusted to close the opening. A cache of the rectangular type is shown in plate IV, fig. 2, and one of the square type in plate II, fig. 1. The former was ten feet high, with a floor eight by four and a half feet in dimensions, at a height of thirty inches from the ground. The latter was of about the same height, from three to four feet square, and about the same height from the ground. These were photographed at the Lower Lake village in 1902, and, so far as known, were the last caches built by any of the Pomo.

In the other two environmental areas acorns and similar foods were stored chiefly in openwork storage baskets, sometimes of several bushels' capacity, and usually kept in the house. Two types of outdoor caches were built, however, particularly in a year of very abundant harvests. The summit of a conical knoll with good, natural drainage was first hollowed out to accommodate one of these storage baskets. A few inches was allowed all around, and a wooden platform was placed in the bottom of the pit to keep the dampness from it. The top of the basket came just even with the top of the excavation, and over this a very low, gently sloping, conical, slab roof was built.



DANCE HOUSE AT SULPHUR BANK, SEEN FROM THE EAST

BARRETT—POMO BUILDINGS

If for acorns, nothing else was needed. If intended for wild oats, grass seeds, or other small grains, the basket was lined with grass or leaves to prevent these running through the meshes. A lot of brush was carelessly thrown over the cache roof to conceal it in case the village suffered a hostile attack.

Another type of cache was made by placing willow-poles in the ground and weaving withes among them so as to produce a cylinder set up from the ground perhaps two feet. It was thatched with grass, and its interior was made and it was used as was the tule cache of the Lake region.

THE SUDATORY

The dwellings above described were used by the women and children at all times, and by the men to some extent. In every village throughout the Pomo region, however, there was at least one relatively small, semi-subterranean structure, such as that shown in plate v, fig. 1, used as a sudatory and men's house, and called *hō'li cane* (N), *hō'cane* (C), and *hō'tsapa hūwan* (SE). Its interior is shown in fig. 2 of the same plate. Such a sudatory had no special ceremonial significance, though in all essentials of form and construction it was the same as the dance house. That structure was, however, from forty to sixty feet in diameter, while the sudatory measured only fifteen to thirty feet, at most. The one here shown was situated, in 1902, at the Sulphur Bank village, and its details were as follows: The pit was twenty-eight feet in diameter and about four feet deep. The center-pole was fifteen feet high and the smoke-hole about two feet square. The tunnel, which faced toward the southeast, was twelve feet long by three feet wide, and three feet and four feet high at its outer and inner openings respectively. The external perimeter of the house measured about one hundred and twenty-five feet and its apex stood about thirteen feet above the level of the surrounding ground.

The men only were concerned with this house, and therefore built it entirely themselves. Women were permitted in it for short periods of time and during the day only, but the men and boys spent much of their time here, especially in the winter. Many of them even slept in the sudatory, for, being covered with earth, it was warm and comfortable. They usually went naked both day and night. They slept directly upon the earth floor, which was strewn with tules or grass, or upon mats and sometimes upon blankets made of rabbit or other skins. The women and girls, of the poorer families at any rate, slept in the relatively open and cold grass- or tule-thatched dwellings

HOLMES ANNIVERSARY VOLUME

and were obliged to use deerskins, rabbit-skin blankets, and other coverings.

It was the custom of every Pomo man to take a sweat bath each day. A fire was built and the sudatory rendered intensely hot. By means of large fans, made of raw deerhide especially for the purpose, the men fanned the heat onto one another and produced a profuse perspiration, after which they ran quickly to the river or to the lake and plunged into the cold water. This sweating was done for the general good of the health, and special sweat baths were taken, usually with beneficial but sometimes with disastrous results, for almost every type of illness. However, the women and girls rarely, if ever, indulged in these sweat baths except in cases of illness.

THE DANCE HOUSE

The most important building in the Pomo village was the ceremonial dance house, a large, semi-subterranean structure in which all important gatherings, particularly those of a ceremonial nature, were held, and which served as the center of the village life. This dance house was called, in contradistinction to the sudatory, *ke'mane cane* (N), *ke' cane* (C), *kū'ya cane* (C), *k'e k'ūan* (SE), and *xō'marak* (E). Like the sudatory, it was quite centrally located in the village. Plate VI, and plate XI, fig. 1, present views of the exterior of the old dance house at Sulphur Bank, the last of the truly aboriginal type of dance house built in the Pomo region. The first of these views is from the east and shows a part of the village on the immediate shore of East lake. The second shows the opposite side of the house. Views of its interior, showing its construction, are given in plates VII and VIII. These photographs were taken after the dance house had stood for several years in disuse and its roof and sides had partly caved in.

The building of a dance house was attended with considerable ceremony. The chiefs, or captains as they are locally called, having decided to build a new dance house, the head captain first called together all the men of the village who were not in mourning; that is to say, all those who had not lost relatives within the past twelve months and who were not, therefore, *dakō'ī* (E). He announced the decision of the captains to build a new dance house and asked that all contribute to a collection of beads to be given to the mourners before the actual building of the house was commenced. Such an announcement was usually received with much pleasure, and the contributions were liberal. After receiving the donations of all the other men of the village, the head captain himself added a substantial number of beads



INTERIOR OF DANCE HOUSE SHOWN IN PLATE VI, SHOWING ITS CONSTRUCTION
AND THE PAINTING OF CENTER-POLE AND CEILING



INTERIOR OF DANCE HOUSE SHOWN IN PLATE VI, SHOWING ITS CONSTRUCTION
AND THE PAINTING OF A SIDE POST

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to it and placed them all on one long string. In case it had been determined to present these mourners with a certain definite number of beads, the head captain always supplied enough to cover any deficiency after the contributions of the others had been received. A messenger was then sent to inform the mourners that they were to receive this present at a certain time, usually from two to four days hence. The mourners at once set about procuring and preparing food for a feast; the men hunting and fishing, and the women making bread, acorn mush, and other foods. On the appointed day the head captain took the members of the village who were not in mourning to the house of one of the mourners which had been designated as the place of assembly and in front of which a brush sun-shelter, or canopy, had been erected. Here they found the mourners already assembled and wailing bitterly; the women scratching their faces, as is customary among Pomo mourners, until the blood streamed down their cheeks. After a short interval of this mourning, the beads were presented by the head captain to one of the male mourners who had been selected as their spokesman. He passed them to the other male mourners and, in turn, they passed them on to the women mourners. Each woman, as she received this string of beads, rose and danced alone, holding the beads before her. They were finally placed in a beautifully woven and decorated basket and set aside for sacrifice to the dead.

The mourners then brought out the food and the feast was spread, after which the head captain addressed them, saying in substance: "We are going to build a dance house, but we wish to do nothing which will sadden you, who have so recently lost your relatives. We therefore have made you this offering of beads and hope you will not feel too sad." The mourners assented with the expression "*o! kūdī' bae*" (*E*), and their leader said in substance: "There is nothing wrong about building a dance house. We have lost our people, but that is no reason why you should not hold ceremonies and have a good time." The visitors then departed, taking with them any portions of the food which had not been consumed, and they were then at liberty to proceed at once with the building of the dance house.

The pit was first dug to a depth of from three to six feet and from forty to sixty feet in diameter. The earth was first loosened by means of digging sticks and then thrown out with plate-form and openwork baskets, being piled up on the embankment and later used as a covering for the roof.

Next the center-pole, the side posts and their stringers were placed, as shown in figure 2. Each of these has its special name, as follows:

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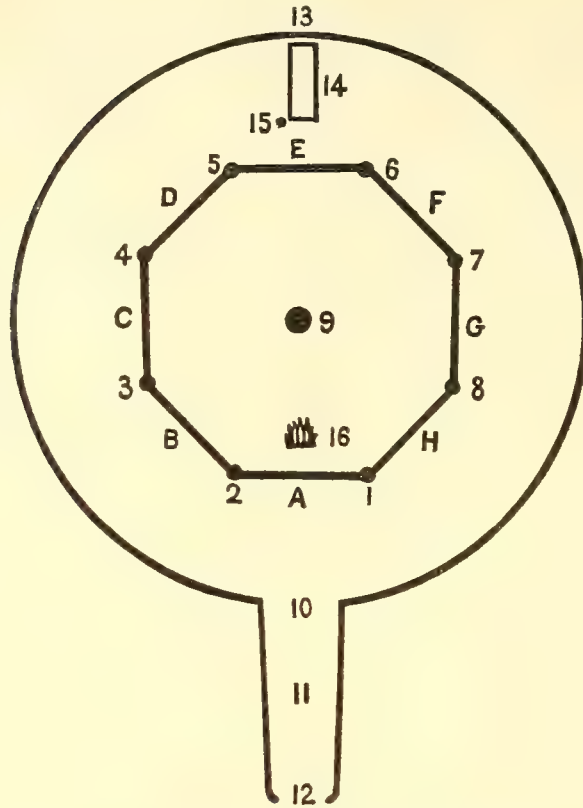


FIG. 2.—Interior of dance house, showing the framework and other important parts.

DANCE HOUSE PARTS¹

1. *tsīlō' dakōik kalē* [drum to hold stick] = right front post.
2. *hwa'ū yō bahnē* [doorward down placed] = left front post.
- 3, 4. *bō'l hmalwa dīlē yō bahnē* [west side of house middle down placed] = left side posts.
- 5, 6. *tsīlō' kō hnawa yō'' bahnē* [drum rear of house down placed] = rear posts.
5. *tsīlō' bōl hnawa yō'' bahnē* [drum west rear of house down placed] = left rear post.
6. *tsīlō' cōl hnawa yō'' bahnē* [drum east rear of house down placed] = right rear post.
- 7, 8. *cōl hmalwa dīlē yō'' bahnē* [east side of house middle down placed] = right side posts.

¹ The names here given are all in the Eastern Pomo dialect unless otherwise indicated by an initial in parentheses.

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9. *cabē'*, *ga'kalik*, *lō* (N), *dīlē bana* (C) = center-pole.
 10. *kawaltsa'pkī* = inner door of the tunnel.
 11. *hwa' kawīda* = tunnel.
 12. *hwa* = outer door of the tunnel.
 13. *bamk*, *hwamk* = rear emergency door in the roof, used only in times of emergency or when it became necessary to open it for ventilation. It was completely covered with earth, as was the remainder of the roof.
 14. *tsīlō'* = drum.
 15. *tsīlō' xale* [drum-stick] = drummers' post.
 16. *xō' gai* [fire place] = fireplace.
 - A. *hwa'ū li''gīwal* [doorward stringer].
 - B. *xō' bōl hmalwa li''gīwal* [fire west side of house stringer].
 - C. *bō'l hmalwa li''gīwal* [west side of house stringer].
 - D. *tsīlō' bō hnawa li''gīwal* [drum west side of house stringer].
 - E. *tsīlō' wīna li''gīwal* [drum top stringer].
 - F. *tsīlō' cō hnawa li''gīwal* [drum east side of house stringer].
 - G. *dīlē' li''gīwal* [middle stringer].
 - H. *xō cōl hma''lwa li''gīwal* [fire east side of house stringer].
- Smoke-hole = *hwa' kaleūleū*.
- Rafters = *hma'rakatō* (this term applies to all rafters except the front and rear main ones).
- Front main rafter = *hwa'ū gūnūlatsil* [door side *gūnūlatsil*].
- Rear main rafter = *na'ūwa gūnūlatsil*.

The roof of the dance house was constructed in the following manner: About the crotched top of the center-pole was tied a loop, called *dako'* (E), of white oak, which served to hold in place the long poles used as rafters. The poles were bound to the stringers, and wherever else necessary, with grape-vine, *ce* (N, C, E), or withes from a bush called *kō'tī kale*. All poles were made of a wood called *bakō'iyūp* (E), and were always laid on the roof in diametrically opposed pairs. Beginning with the pair comprising the main front and rear poles, they were laid on so that each pair bisected two diametrically opposed existing angles. On these rafters were placed four horizontal rows of poles, called *coko't!i* (E), each row forming a complete circle about the roof and all spaced equidistantly.¹ Next, a layer of woven twigs, called *la'xowī* (E), was placed horizontally on the rafters. Then a similar layer was laid on vertically. This was followed by a layer of tule matting made by the women. Each of these mats was placed

¹ Professor Holmes, in his "Anthropological Studies in California" (*Report U. S. Nat. Mus.*, 1900), shows drawings (pl. 17, figs. 1 and 2) in which a somewhat different arrangement of rafters is illustrated. This was probably sometimes used, but the arrangement above mentioned was the more usual one.

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by its maker, preferably over that particular part of the dance house where her near male relatives were regularly located. Upon this was placed a layer of dried grass, and upon this a layer of mud, over which the loose earth covering of the house was thrown. The mud rendered the roof especially water-tight, and, at least partially, fireproof. Beginning at the bottom of the roof, the earth was thrown on it with the hands, with openwork sifters, and with plate-form baskets. This earth was that taken from the pit, but if additional earth was needed, it was dug from immediately around the outside of the dance house.

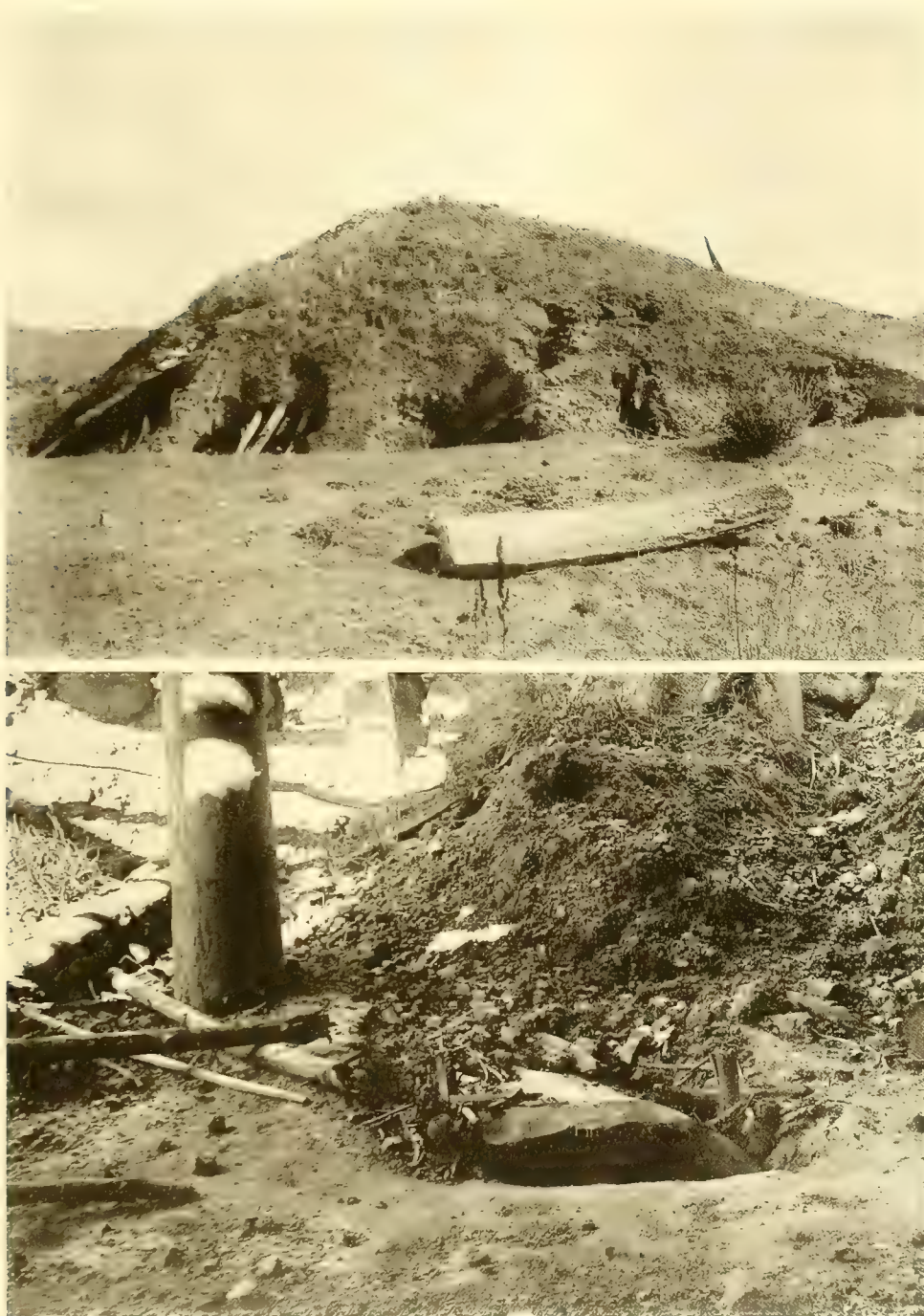
There were two regular openings in the dance house, the door and the smoke-hole, neither of which was covered at any time. The smoke-hole was from a third to half way down from the apex of the roof and directly in line with the tunnel. It was immediately over the fire and served primarily to conduct the smoke out of the house, though it was used as an opening through which to throw firewood into the house and as an entrance for dancers at certain ceremonies.

The tunnel varied in length, according to the size of the house and the topography of its situation, from perhaps ten to twenty feet, and in height from four feet at its outer extremity to five or seven feet at the inner opening. It was usually from three to six feet in width.

There was at least one, and sometimes as many as four, openings, which might properly be termed emergency doors, near the edge of the roof. These were about the size of the smoke-hole but were covered as was the rest of the roof, except that the short special sections of the rafters and other poles used were not bound in any way but were simply held in place by the weight of the earth. Just below each opening, where necessary, was bound a bar at the proper distance to permit a man to swing himself up onto it and kick or push the cover away so as to open the exit. This was used especially in case of fire or in event of a surprise attack. Similar openings were placed in the roofs of the sweat house and of the earth-lodge dwelling.

The dancing area, in the center of the house, was covered with a layer, perhaps an inch thick, of rich black earth and adobe, in the proportions of two to one. This was carefully mixed and spread over the floor, being smoothed evenly while wet, and then covered with a layer of coarse sand. All these materials were procured and used by the fire-tenders only.

The large dance house shown in plates VI to XI was situated in 1902 at Sulphur Bank. Its details were as follows: The pit was fifty feet in diameter and five feet deep. The center-pole measured about twenty inches in diameter and eighteen feet high. There were seven side posts, each set about four feet out from the wall of the pit. A



1. DRUM, SIDE VIEW. 2. DRUM, END VIEW AS IT RESTED UPON ITS SUPPORTS OVER THE PIT. IT IS LARGELY COVERED WITH DÉBRIS FROM THE ROOF

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natural crotch or a notch appeared at the top of each and held the stringers, which in turn supported the rafters. All important joints or crossings were bound with grape-vine. As a support for the wall of the pit, posts were placed about three and a half feet apart and a retaining wall of stones laid in mud mortar was built entirely around it. The roof was of tule mats covered with earth. See plates VII and VIII.

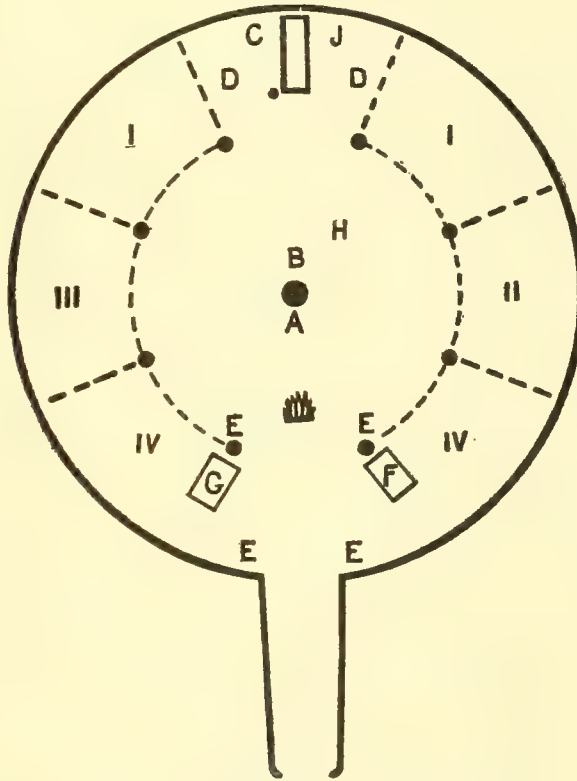


FIG. 3.—The fixed positions in the dance house.

The painting was of the typical "dream" type. That of the center-pole consisted of eleven bands, seven red and four white, each about three and a half to four inches wide. Four lines ran spirally around it from left to right, and another four from right to left. Each made two complete revolutions of the pole as it went from bottom to top, and each was about an inch in width. These lines were alternately red and white. Each of the side posts was painted with two white and four red bands similar to those on the center-pole. Each of the

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stringers passing from post to post had three white bands, and, on the ceiling, at a distance of about six feet down from the apex of the roof, was a white band about three inches wide, while at about five feet from the lower ends of the rafters was a similar band extending entirely round the ceiling. The designs are shown in plates VII and VIII.

The tunnel, facing toward the southeast, was about twelve feet long, and its inner and outer openings were respectively about six and four and one-half feet high. Two rafters, somewhat larger than the others, extended from the two posts which formed the side posts of the inner door and these were painted at intervals of about ten inches with bands of red throughout their entire length.

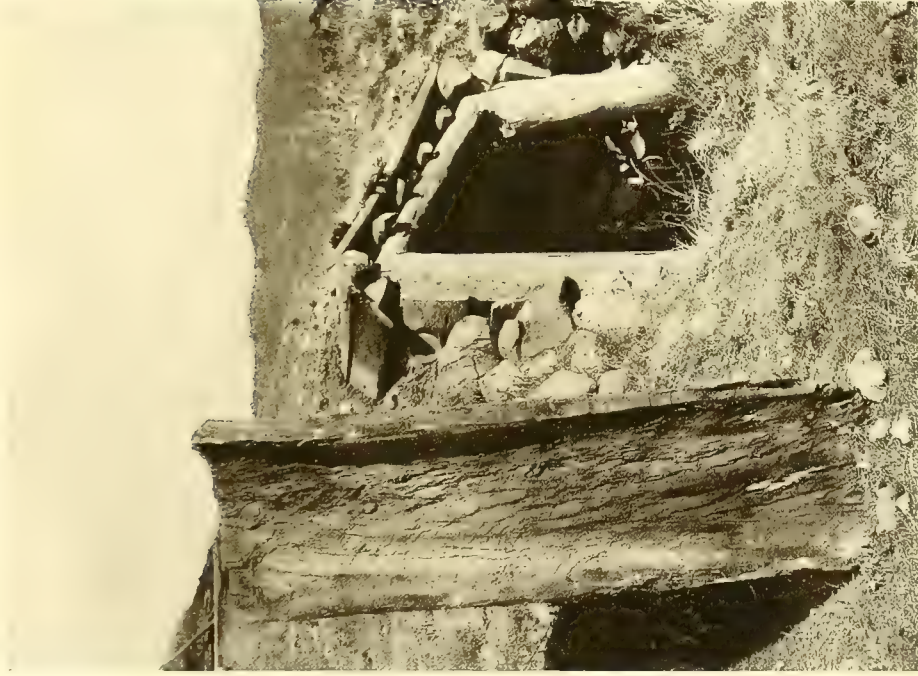
POSITIONS IN THE DANCE HOUSE

The special positions within the dance house are shown in figure 3, and their names are given in the Eastern dialect, unless otherwise indicated by an initial in parentheses in the following list:

- A. *cabē' xōwa* [center-pole both sides] = the position in front of the center-pole, reserved especially for the head chief of the village.
- B. *xe'mihya gai* = position of the singers.
ke'ūya (C).
- C. *tsīlō' gaūk gai* [drum man place] = position of drummers.
tsīlō' matūtsī [drum occupation] = position of drummers.
- D. *xe' gūhmak gai* = dancers' positions when at rest.
- E. *me'dze gai* = positions of fire tenders—anywhere in the vicinity of these two front posts and the wood piles.
la'imoc (C).
- F, G. *xa'i gai* = "wood place."
- F. *cō'l hmalwa* [east side of house] = wood place to the east of the door.
- G. *bō'l hmalwa* [west side of house] = wood place to the west of the door.
- H. *he'līma*
xabē' dīma } = position of the master of ceremonies.
xabē' gaūk }
- J. *nō' xahlūgak gai* = position of the ash devils in the ghost ceremony.
nō' kūya (C).
- I, I. = Sections reserved for visitors from villages toward the north.
- II. = Section reserved for visitors from villages toward the east.
- III. = Section reserved for visitors from villages toward the west.
- IV, IV. = Sections reserved for residents of the village giving the ceremony, i.e. hosts.
hwa'ū = downward, the front part of the house.
hna'wa = the rear part of the house.
cō'l hmalīdai [east side of house] = eastern side of the dance house.
bō'l hmalīdai [west side of house] = western side of the dance house.



DRUM, UPPER SIDE



1. DRUM, UNDER SIDE



2. DRUM, END VIEW, SHOWING ITS THICKNESS AND
THE NATURAL CURVATURE OF THE LOG FROM
WHICH IT WAS MADE

BARRETT—POMO BUILDINGS

THE DRUM

One of the most important and characteristic features of the Pomo dance house was the large wooden drum which was played by stamping upon it with the bare feet. Plates IX–XI show five views of the drum which was in the above-mentioned dance house at Sulphur Bank and which was photographed in 1902. It is characteristic, in every respect, of the old type of Pomo drum. Fig. 2 of plate IX shows the drum as it was found almost covered with *débris*. The other four figures show the drum after it had been removed to the sun outside the dance house for photographing. It was then returned to its former position within the dance house.

This drum was a section from an oak log and measured about six feet in length by twenty-two inches in width. It had been cut from a sufficiently large tree to produce a fairly flat section when finished, as is shown in the end view in fig. 2 of plate XI. Its bark was removed, and it was carefully hollowed out and reduced to the uniform thickness of about two and a half inches. Its upper and lower surfaces are shown in plate X, and plate XI, 1. A trench, the width of the drum and about eighteen inches in depth, was first dug, and near each end two short, stout stakes were driven so that they came about even with the surface of the floor. Heavy grape-vines were then twisted back and forth between these stakes in such manner as to form a firm support for the drum, which was placed upon them with its curved surface uppermost. Plate IX, fig. 2, shows the front pair of these stakes and the twisted grape-vine support on which the drum rests. This trench formed an excellent resonance chamber, and a space about a foot in length was left in front of the drum for the easy passage of the sound. Such a drum produced a deep, booming tone as the drummer stamped upon it. To steady himself, the drummer had a stake set firmly in the ground near the front right-hand corner of the drum. Its position is shown at 15 in text figure 2.

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Representative Art of Primitive People

By FRANZ BOAS



WHEN studying the graphic and plastic arts of primitive people, two aspects have to be distinguished—the type of art which develops from the mastery of technique, and the other which develops from the attempts at a graphic representation of objects which interest the people.

When we speak of art, we have to bear in mind that all art implies technical skill. It is therefore an improper use of the term to speak of primitive art when we refer to objects in which the producer does not possess that mastery of technique that makes the product of his labors a work of art. A basket, a pot, or a wooden object, crudely made and irregular in outline, cannot claim the term of a product of artistic activity. On the other hand, the increase in skill brings it about that the products of the handicraft of man attain an artistic value. An inexperienced basket-maker who does not control the movements of her hands will produce an uneven fabric, the stitches of which will be different in size and different in texture, and which will for this reason possess an irregular surface. On the other hand, the expert basket-weaver will have such control over her movements that all the various operations will be performed in an automatic manner; so that the intensity of pull and the manner of twisting that are necessary in these operations will be performed with even intensity. For this reason the stitches will be absolutely regular, and the regularity itself will produce an esthetic effect. The same is true in the case of woodwork, where the use of the ax or of the adz in the hands of the expert workman will be so automatic that perfectly regular lines and surfaces will be produced. This virtuosity in the handling of tools and of materials is the very essence of artistic skill; and we may safely say that in many cases the esthetic effect of the manufactured objects is not due to a primary intention on the part of the manufacturer, but is a secondary product of the possession of masterly skill.

While this skill may produce regularity of outline, it does not necessarily result in designs. As soon, however, as the workman begins to play with his technique—an occupation that is enjoyed by every virtuoso—then the opportunity is given for the origin of design. The potter who in turning her pot gives it regular impressions with the

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nail of her thumb, the basket-maker who in playing with her technique develops the art of twilling, or the woodworker who varies the form of the surfaces over which he works with his adz, are led at once, by this very play with the technique, to the creation of decorative designs.

In all these matters we do not presuppose any impulse that has for its primary object the creation of esthetic forms: the esthetic forms appear rather as secondary products of virtuosity. Neither do we need to presuppose in this line of activities any desire to represent forms, and to convey ideas by means of decorative forms.

It is obvious, however, that these technical activities do not exhaust the range of forms that are found as products of the artistic skill of primitive man. We find everywhere attempts to convey definite meanings by means of graphic outlines or sculptural forms. These may be simply what has been called *Augenblickskunst* by Wilhelm Wundt; that is, forms which are intended only for the use of the moment, and that are designed to represent to the mind of the maker or to that of others certain impressions received from the experience of the moment. In these productions the artistic element is practically absent, because the outlines are always crude, and there is no technical skill exhibited in their execution.

It is characteristic of the development of representative art, however, that the technical skill which is acquired in the development of technical art is applied also to the execution of representative forms; and it is in this case that we actually find the beginnings of representative art.

It is not my purpose to discuss in the following lines the intimate relations between decorative art and representative art that do develop in many cases, and that are found with particular strength in primitive life. This subject has been discussed fully and extensively in many publications, among which must be mentioned the excellent contributions by Prof. William H. Holmes, published in the Annual Reports of the Bureau of American Ethnology. It may be sufficient to point out that, according to our present point of view, it seems futile to discuss the question whether representative decorative art is older than geometrical decorative art, but that it rather appears that we are dealing here with two different sources of artistic activity, which tend to merge into the development of graphic and plastic arts. We may recognize both a tendency to geometrical conventionalization of representative design whenever it is used for decorative purposes, and we may also recognize the tendency to read meaning into geometrical decorative design when it is given representative value.

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Considerable interest attaches to the question of the characteristics of both the crude and the more highly developed representative designs that occur in various cultural stages.

We will direct our attention here particularly to the attempts at representation on a surface; that is to say, to the graphic arts of drawing, engraving, and painting.

It is clear that whenever man tries to represent objects of nature in this manner, he is confronted with the problem of showing a three-dimensional object on a surface. The complete presentation of the object in all its aspects cannot be given; and the question therefore arises of solving the problem how to represent in an adequate way a three-dimensional object in a two-dimensional space.

When we examine the products of the art of primitive people, we find that on the whole a method is used which is apparently quite foreign to our modern feeling. While in our modern perspective drawing the painter tries to give the visual impression of the object, showing only what we believe we see at any given moment, we find that in more primitive forms of art this solution of the problem appears unsatisfactory, for the reason that the momentary position of the object will not exhibit certain features that are essential for its recognition. For instance, if a person is seen from the back, the eyes, the nose, and the mouth are not visible; but at the same time we know that eyes, nose, and mouth are essential characteristic elements of the human form. This idea is so fundamental in the view of most primitive people that we find practically in every case the endeavor to represent those elements that are considered as essential characteristics of the object to be represented. It is obvious that when this is to be done, the idea of rendering the momentary impression must be given up, because it may not be possible to see all these different features at the same time; and thus we find that one of the characteristic traits of primitive art is the disregard of the relative position of the essential elements of the object of representation.

It is interesting to note that the same problem presents itself to the child when it first tries to draw, and that the solution of the problem generally follows the same line that is adopted by primitive man; namely, the endeavor to represent all those elements that are considered as essential and characteristic rather than the actual spacial relations as they appear at any given moment. We must explain from this point of view the profiles with two eyes, or the outlines of the body under the garments, which occur in the drawings of both children and primitive tribes.

However, it must not be assumed that this tendency is indepen-

BOAS—PRIMITIVE ART

dent of certain traditional characteristics that impress a style upon every particular area. This may be observed even in cases where we are dealing with realistic representations executed in very crude outlines. Thus the human form as represented in certain South American drawings consists very often of a triangle with point downward, the two descending sides of the triangle being continued as legs, while the horizontal line on top represents the shoulder line, and is continued outward so as to represent the arms. In other regions we find that the human body is often represented by a curved line which is open below and terminates in the legs and feet. The Eskimo, on the other hand, never utilize a form of this kind, but always execute their drawings in the form of silhouettes. On account of their tendency to show silhouettes, attention is directed only to the outlines, which are executed in many cases with a remarkable degree of fidelity to nature. On the other hand, the artist of the Magdalenian period was not satisfied with the mere outline, but tried to fill in details that the Eskimo habitually disregards. The treatment of the body by the Bushman shows again other characteristics. Cases of this kind indicate that we have to speak of traditional style even in those cases in which the forms seem at first glance to be a result of the naïve attempt at representing essential elements of the object to be represented. This stylistic character is expressed both in the outline and in the traits which are selected for representation.

The fundamental idea that in the representation of an object its essential traits must be shown has led to the development of artistic styles, which demonstrate a high technical skill, but which are quite foreign to our feeling. Perhaps the most characteristic case is that of the art of the Indians of the North Pacific coast of America, in which the principle of the representation of an object by means of symbols is carried to extremes. The conventional form in which an animal body is represented does not differ much for various types of animals; but the fundamental rule underlying the art is that the characteristic parts of the animals *must* be shown. Thus a beaver, which is characterized by the large incisors and by the tail, *must* contain these elements, no matter how the rest of the body may be treated. The killerwhale *must* show the large dorsal fin, no matter how the rest of the body may be treated.

Since the art of the Northwest coast is at the same time, on the whole, a decorative art, in which definite principles have developed in regard to the treatment of the decorative field, we find that the method of representation consists always in the attempt to squeeze the symbols of the animal that is to be represented into the decorative

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field and follow the rules of the treatment of surfaces that are presented by the style of the Northwest Coast art.

When we compare the art of the North Pacific coast, which has developed this tendency to an extreme degree with our modern art, it might appear that the principles are fundamentally opposed to each other. Nevertheless it is easy to show that modern art is only slowly and by degrees emancipating itself from the idea that the representation of a three-dimensional object should contain the essential permanent characteristics of the object. If we remember that the imagination of the primitive artist is given its direction by the desire to represent all the essential parts of his subject, no matter whether they may be visible at a given moment or not, we can see that the paintings of the middle ages, in which different scenes of the same incident are represented in the same painting, follow out to a certain extent the same idea. Thus if we see in one painting Adam and Eve in Paradise on the left, the serpent in the middle, and the expulsion from Paradise on the right, it is clear that the artist followed in a way the same principle of showing the essential scenes in the same painting, although they do not belong to the same visual impression. But we can go a step farther. Large groups, like those of the Dutch painters, in which, on a large canvas, many individuals are shown with equal distinctness, do not represent the momentary visual impression. We see with distinctness only a small part of the visual field, while the rest appears blurred, and the painting therefore represents, not a momentary visual impression, but a picture reconstructed from a succession of impressions that are obtained when the eye moves over the whole field of vision. The discrepancy between the momentary impression and the painting is particularly striking in those cases where the picture itself is small and can be taken in at a single glance. Then the sharpness of outline with which all the figures stand out is contradicted by our everyday experience. It is only quite recently that pictorial art has used this phenomenon to any extent in order to compel the viewer to direct his attention to that point that is prominent in the mind of the painter.

Similar observations may be made in regard to color. We find that almost throughout, the colors which are utilized are those in which an object appears to us permanently. It is only with difficulty that most of us get accustomed to green faces, such as appear in the shadow of a tree, or red faces that may be produced by red curtains or the reflection of a brick wall. In these cases the abstraction from the momentary impression is so strong that most of us are not even aware that we actually do see these passing color effects.

It appears from this point of view that the principle of painting

BOAS—PRIMITIVE ART

what may be called the permanent characteristics of an object have not by any means disappeared from modern art, and that, although the conflict between the momentary visual impression and what we consider the permanent form is not as fundamental as it is in many forms of primitive art, its effect may be traced even into modern times.

It is easy to show that the absence of realistic forms in the representative art of primitive tribes is not due to lack of skill. For instance, in those rare cases in which it is the object of the artist to deceive by the truthfulness of his representation, we find that the narrow lines imposed by conventional style may be broken through. Thus the wood-carvers of the North Pacific coast, who are hemmed in so rigidly by the conventional style of that region, succeed in carving heads remarkably true to nature, which are used in their winter ceremonies, and which are intended to give the impression that a certain person has been decapitated. A remarkable specimen of this kind has been illustrated in the Annual Report of the United States National Museum for 1895 (page 504). Equally convincing are some attempts of these Indians to reproduce in wood-carving classical statues that have been shown to them. We must rather seek for the condition of their art in the depth of the feeling which demands the representation of the permanent characteristics of the object in the representative design.

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Certain Similarities in Amulets from the Northern Antilles

By THEODOOR DE BOOY



PERHAPS few objects of West Indian manufacture extant today show the clever stoneworking abilities of the primitive inhabitants of the Antilles so clearly as do the small amulets from those islands that are found in almost all archeological collections. Fashioned from some of the hardest stones known, the investigator often wonders by what means the aboriginal artisan succeeded in shaping these objects so skilfully with the primitive tools at his disposal. The finished object doubtless was held in the highest veneration by its owner and guarded with every precaution against breakage.

The early historians refer frequently to *zemis* and to small idols, which undoubtedly were the amulets under discussion. To avoid an extended enumeration of the historical references to the amulets, the writer can do no better than to quote from an able paper by Dr J. Walter Fewkes¹ on this subject:

The objects described in the preceding pages are supposed to be identical with the small idols called *zemis* by early writers, who declare that the natives bound them to their foreheads when they went to war. A reference to Roman Pane's statement that the islanders wore *zemis* in this manner has already been made. Peter Martyr describes certain idols used by the people of Hispaniola in their worship, which were undoubtedly amulets. He says: "These images the inhabitantes call *zemis*, whereof the leaste, made to the likeness of young devilles, they bind to their foreheades when they goe to the warres against their enemies." Francisco Lopez de Gomara, in describing the customs of the Indians of Hispaniola, says: "*Atanse a la frente idolos chiquitos quando quieren pelear.*" (They bind little idols to their foreheads when they wish to fight.)

From this quotation from Dr Fewkes' paper it will be seen that the classification of the amulets as *zemis* or deities is quite permissible.

During the last four years the Museum of the American Indian in New York City has acquired for its West Indian collections four amulets of a type that hitherto has not been figured in any of the papers on the archeology of the Antilles. In addition, the American Museum of Natural History recently acquired two amulets of the type

¹ Fewkes, J. Walter, Pre-Columbian West Indian Amulets, *American Anthropologist*, N. S., vol. v, no. 4, Oct.-Dec. 1903, pp. 679-691.



a



a'



a''

STONE AMULET FROM NORTH CAICOS

DE BOOY—ANTILLEAN AMULETS

under discussion, which were among a number of archeological specimens from Porto Rico. The writer wishes to express his indebtedness to Dr P. E. Goddard of the American Museum of Natural History for photographs of the two Porto Rican amulets, to Mr C. W. Mead of the same Museum for particulars regarding them, and to Mr L. P. Gratacap, also of the American Museum, for the identification of the stone from which the amulets described in this paper were manufactured. In addition to the six amulets referred to there is in the museum of the Hispanic Society of America, in New York City, an amulet of the same type, and the writer tenders his thanks to that Society for permission to introduce an illustration of the specimen and for information concerning it. The eighth specimen of this class belongs to Mr A. M. Archer, of New York City, who kindly lent it to the writer for photographing and also afforded such scant information as was available concerning the object. Aside from the eight amulets discussed and illustrated in this paper, the writer knows of no others of the same type amongst the great number of West Indian amulets in various scientific institutions and private collections.

A number of years ago, while the writer was conducting archeological investigations in the Caicos islands, he heard of a stone amulet that had been found by a negro on North Caicos island and sold by the finder to Mr W. Stanley Jones, a resident of Grand Turk, one of the Turks islands. This specimen, illustrated in plate I of the present paper, was described briefly by the writer in 1912 in his "Lucayan Remains on the Caicos Islands,"¹ in which it is stated:

Some years ago a very interesting stone idol was found in the neighborhood of the Kew settlement. Plate VI shows three views of this idol which I was not able to acquire and for the photograph of which I am indebted to Mr J. S. Cameron, owner of the East Caicos Sisal plantation. It is curious to note the pierced ears and the manner in which the feather head-dress is represented.

The writer at the time omitted to mention the size of this object and a number of other interesting facts concerning it. In 1913 the Museum of the American Indian procured the specimen from Mr Jones, and its collections were thereby enriched by the addition of what is perhaps the finest example of Antillean stone carving known.

In 1913, during a sojourn on the island of Santo Domingo in the interest of the Museum of the American Indian, the writer examined an amulet in possession of Prof. Rodolfo Cambiaso, of Santo Domingo City (whose collection from Hayti and Santo Domingo is perhaps the best on the island), which, while far smaller than that from North

¹ Booy, Theodoor de, Lucayan Remains on the Caicos Islands, *American Anthropologist*, N. S., vol. XIV, no. 1, Jan.-Mar. 1912, pp. 81-105.

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Caicos, bears a marked type resemblance to it. Professor Cambiaso informed the writer that he had procured the amulet in the Cibao mountain region of the province of Santo Domingo. This specimen also was acquired for the Museum of the American Indian, and is illustrated in plate III, *g*, of this paper.

In 1914, during another stay on the island of Santo Domingo, the writer's attention was drawn to still another amulet of a type so similar to the one from Caicos island that he procured it from its owner, Dr Natalio Rodondo. This specimen had previously been imperfectly figured in the work of its former owner, Dr Narciso Alberti¹ (page 142), and is illustrated in plate II, *b*, of the present paper. Regarding this specimen Dr Alberti states:

A zemi found in the Vega Real [interior of the Republic of Santo Domingo] has come to my hands, which zemi is the crocodile god: it has the tiara or casket which the Quisqueyanos placed over the heads of their divinities, and at the same time it completely looks like the figure of the Egyptian god Sebak-Ra (the crocodile). This figure, this Quisqueyano zemi, which was given me by Señor Carlos M. Sanchez, was found in a gully in which some boys were bathing, and, believing it was a frog, the boys threw stones at it, until it broke in the middle. This was the fate and the finish of the Quisqueyano zemi.

It may be mentioned that Dr Alberti's work on the history of Quisqueya is an attempt to prove relationship between the Phenicians and Egyptians and the aborigines of Santo Domingo, hence he embraces the opportunity to attribute some Phenician or Egyptian significance to every object of antiquity that came into his hands.

The fourth amulet in this series, illustrated in plate III, *h*, was found by Mr M. R. Harrington, of the Museum of the American Indian, at Mesa del Sordo in the Baracoa district of the eastern part of Cuba, in 1915, while conducting archeological investigations.

The fifth amulet and the sixth (pl. II, *c*, and III, *f*) were acquired in 1915 in Porto Rico by Mr J. Alden Mason while making an ethnological and archeological survey of that island in the interest of the New York Academy of Sciences and the American Museum of Natural History.

The most interesting amulet, historically, is that in the collection of the Hispanic Society of America, illustrated in our plate III, *d*. This specimen was presented to that institution by Mr E. Howard Grinnell, of New York City, who also furnished the information pertaining to it. The amulet was acquired by Washington Irving in Spain while ambassador to that country in 1842-46, and was probably taken to

¹ Alberti, Narciso, *Apuntes para la Prehistoria de Quisqueya*, La Vega, Dominican Republic, 1912.



b



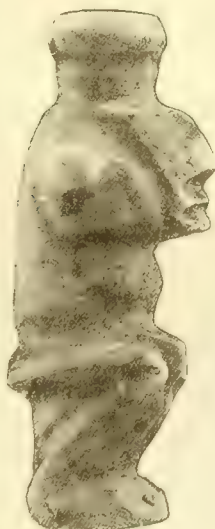
b'



b''



c



c'



c''

STONE AMULETS (*b*) FROM SANTO DOMINGO AND (*c*) FROM PORTO RICO

DE BOOY—ANTILLEAN AMULETS

Spain when the island of Hispaniola (Santo Domingo) was a colonial possession. A label on the back of the amulet states that it came from the Cibao mountains of Santo Domingo.

Mr A. M. Archer, the possessor of the eighth and last amulet (pl. III, *e*), states that this object was acquired by him during a residence in Santo Domingo City and that it came from the vicinity of Comendador, a village in the interior of Santo Domingo at the Haytian border.

The North Caicos specimen (pl. I), 4½ inches in height, is made of serpentinous stone (altered amphibolite), maculated with dark-green spots. The figurine has a prominent mouth, with teeth indicated by incised lines. The nose also is prominent, and both nostrils are shown. The head is covered with an elaborate ornament which may be taken to represent a conventionalized head-dress with a serrated crest. The eyes are represented by shallow circular pits. The ears are divided into a large upper and a small lower lobe, and the lobes are ornamented with incised lines. A shallow pit appears in the frontal part of the lower lobe, as if the maker wished to indicate a pierced ear. No arms are indicated. The amulet is perforated for suspension at the junction of the head and the body. The legs of the deity are flexed under the haunches, and the trunk is erect. The knees are spread apart, and the piece of stone remaining between the legs may be the result of the process of manufacture or may have been intended by the carver to represent either an apron or a phallus. A band in relief surrounds the ankles of the figurine, suggesting the Arawak custom of binding the lower legs under the knees and above the ankles in order that by thus retarding the circulation the calves of the legs would become enlarged. The feet are proportionately larger than the rest of the body, a well-known feature in the anatomy of monkeys, and it may have been the intention of the maker of the amulet to represent the figurine with monkey feet, especially as the toes, indicated by incised lines, curve under the feet.

The amulet from Cibao, Santo Domingo (pl. III, *g*), is of white limestone and stands an inch and a half high. As the feet of this specimen are missing, its original height was probably a quarter of an inch more. The mouth is prominently shown and has incised lines to represent the teeth. The nose also is clearly indicated. The head is covered with a banded crown, probably representing a head-dress, or possibly the ceremonial table upon which the aboriginal priests placed offerings to their deities.¹ The eyes are in relief, with a narrow

¹ Fewkes, J. Walter, *An Antillean Statuette, with Notes on West Indian Religious Beliefs*, *American Anthropologist*, N. S., vol. XI, no. 3, July-Sept. 1909, pp. 348-358.

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incised line to denote the separation of the lids. The ears are shown by two knobs. No arms are indicated. As in the amulet last described, this one is perforated for suspension where the head joins the body, but in addition is perforated vertically. Also as in the North Caicos specimen, the deity is shown with the legs flexed under the haunches and the body erect. The knees are spread apart in the same manner, and have a similar triangular piece of stone between the legs. No details can be given about the feet and ankles, as these are missing.

The amulet from La Vega, Santo Domingo (pl. II, *b*), is of a buff nephritic stone (amphibolite) and stands $3\frac{3}{8}$ inches high. In this specimen also the mouth is prominently shown and has incised lines to represent the teeth. The nose consists of a large round knob. The head is covered with a banded crown, as in the case of the Cibao specimen. The eyes are indicated conventionally by an incised line dividing a slightly raised band extending from ear to ear over the nose. The ears are divided into a large upper and a small lower lobe, which are ornamented with incised lines. The amulet is perforated for suspension where the head joins the body. As in the two preceding specimens, the body of the amulet is erect and the legs are flexed under the haunches. In fact, while somewhat smaller in size, this specimen is absolutely identical below the head to the North Caicos amulet, the legs, feet, and toes, and the band around the ankles being in the same positions and represented in the same manner. Attention should be directed to the incised lines on the backs of the amulets from North Caicos and La Vega. No arms are shown on the La Vega amulet.

The zemi from Mesa del Sordo, Baracoa, Cuba (pl. III, *h*), is of a whitish nephritic stone (amphibolite); it stands an inch and a quarter in height, and is the smallest of the amulets herein considered. Even in this diminutive amulet the mouth is prominently shown and is provided with incised lines to indicate the teeth; the nose is not quite so clearly represented as in the other specimens; the head is covered with a banded crown of the same type as in the two amulets before described; the eyes are shown by raised circular bands, in the middle of which is a shallow pit; the ears consist of knobs divided into two lobes by a shallow incised groove. Like the specimen from Cibao, Santo Domingo, this Cuban amulet is perforated for suspension where the head joins the body, and from the top of the head vertically through the body to the soles of the feet. The remarks regarding the features of the lower part of the amulet that have been made respecting the three preceding specimens apply to this one, with



d



d'



d''



e



f



g



h

STONE AMULETS FROM THE WEST INDIES

DE BOOY—ANTILLEAN AMULETS

the exception that no band encircles the ankles and no arms are shown.

The larger Porto Rican amulet (pl. II, *c*) is of a cream-colored nephritic stone (amphibolite) and stands $2\frac{5}{8}$ inches high. The mouth of this figurine is represented by two deep, incised lines, but no teeth are shown. The nose is prominent, but the eyes are merely indicated in a conventional manner by two shallow incised grooves. In this amulet also the head is covered by a banded crown, which, relatively speaking, is of greater height than the crown shown on the amulets from Cibao, La Vega, and Mesa del Sordo. A large knob serves to indicate the ear. Unlike the preceding specimens, this amulet does not have a perforation below the head for suspension; it is provided with a vertical perforation, however, from the top of the head through the body to the soles of the feet. No arms are shown. The legs are flexed under the haunches and the body is erect. The knees are spread, and the triangular piece of stone to which attention has already been drawn appears between the legs. As a result of a fracture, one of the feet is missing, but the other foot indicates that there was no marked difference in that respect between this and the amulets before described. No raised band, however, surrounds the ankles.

The sixth specimen (pl. III, *f*), also from Porto Rico, is made of a white nephritic stone (amphibolite) and stands an inch and three-quarters high. The nose and the eyes of this zemi are shown in a highly conventionalized manner by incised lines; a double-banded crown surmounts the head; the ears are indicated by large knobs. This specimen has been perforated for suspension below the ears and vertically from the head through the body to the feet. Again the figurine is shown with body erect and legs flexed and with the triangular piece of stone between the legs. There are no arms. The feet are proportionately large, and provided with incised grooves to indicate the toes, which extend under the feet.

The seventh specimen (pl. III, *d*) is from the Cibao mountains of Santo Domingo; it is made of a white nephritic stone (amphibolite) and stands $2\frac{1}{2}$ inches high. The nose, eyes, and mouth of this amulet are shown in a highly conventionalized manner by bands in high relief and by incised lines. A triple-banded crown covers the head; the ears are represented by large knobs. This zemi is perforated for suspension below the ears. No arms are shown. The body has the usual haunched position, with the other characteristics of the specimens previously described. The feet are not so well carved as are those of the other amulets, and, owing to a fracture, the toes are missing.

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The final zemi (pl. III, *e*) differs from the other specimens in that an incised line indicates the upper arm, so that in this feature, as well as in the absence of a crown, the amulet from Comendador stands apart from the other seven. This one is of a white nephritic stone (amphibolite) and stands $2\frac{1}{4}$ inches high. In all other particulars it may be classed with the others. The eyes, nose, and mouth are well indicated by grooves; the ears are divided into an upper and a lower lobe, and the lower lobes are perforated; the body is shown in the usual haunched position. The amulet is perforated below the ears for suspension, and also vertically from the top of the head through the body to the soles of the feet.

The writer wishes to note particularly that, with the exception of the eighth specimen, perhaps the most prominent points of similarity between these amulets are that they are all devoid of arms, that the legs in all cases are flexed under the erect body, that the triangular piece of stone between the legs is present in every specimen, no matter what the significance the maker wished to imply by it, and that the head in each instance is surmounted by an ornament of some kind. The minor differences in the eyes, mouth, ears, etc., found in the eight amulets are merely indicative of the vagaries of the makers and of the different techniques employed by them.

As has been seen, the history of each of the eight amulets is quite clearly known. We find these objects distributed over a region between 18° and 22° N. latitude, and 66° and 75° W. longitude, or approximately 240 miles from north to south and 540 miles from east to west. This range of distribution is not so noteworthy when one considers the long canoe voyages that were undertaken by the pre-Columbian aborigines of the West Indies; yet it would tend to indicate that these inhabitants either worshipped the same deities and hence had closely related religious beliefs, or that they waged war against one another and that the amulets, tied to the foreheads of chiefs, were lost in conflict. To the writer, however, it would seem more likely that the amulets were highly prized articles of barter amongst the natives or were gifts from one cacique to another, in which event the first theory would be tenable, namely, that the inhabitants of the various islands of the northern Antilles worshipped the same deities, or at least venerated them in common. In any event a critical examination of the amulets illustrated in this paper will convince the student that they were undoubtedly meant to represent a single particular zemi.

Aboriginal Forms of Burial in Eastern United States

By DAVID I. BUSHNELL, JR



URING pre-Colonial days, eastern United States was the home of numerous tribes which differed in language, manners, and customs, including that of the burial of their dead. Separated by mountain ranges and river valleys, often the avowed enemies of their neighbors, they developed different habits, influenced in many instances by their natural environment. Of the many tribes, those of the Algonquian stock were the most numerous, and extended over the widest area, which included the whole of New England, and the country westward to the Mississippi and southward along the coast to near Cape Lookout in North Carolina. Thus they practically surrounded the Iroquoian tribes, which at the first contact with Europeans occupied the central portion of the present state of New York, a part of the valley of the St Lawrence, and the lands westward along the southern shores of Lake Erie. But very little is known of the tribes of the latter region, as they had vanished from history by the middle of the seventeenth century, soon after the coming of the first French missionary. South of this region, extending to and beyond the Ohio and eastward into the mountains, was a vast expanse of territory within which were no permanent settlements. This was, however, in all probability, the ancient home of Siouan tribes which, not many generations before the arrival of Europeans, had left their earlier habitat and moved down the valley of the Ohio, later to settle beyond the Mississippi. To these tribes may be attributed the majority of the earthworks and other traces of early occupancy of this region, including certain mound burials in which the brachycephalic crania are similar in all respects to those of the present-day Osage. Eastward from the Mississippi to the Atlantic, through the present states of Mississippi, Alabama, and Georgia, lived many Muskhogean tribes which were first encountered by the Spanish expedition of De Soto, 1539-1541, and who continued to occupy the same region until the early part of the nineteenth century. During the years following their first contact with the Spaniards, many of the smaller tribes became more closely allied, thus forming the Creek Confederacy whose principal centers developed in

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the valleys of the Chattahoochee and the Tallapoosa, with their tributaries. The Yamasee, the ancient inhabitants of the coast of Georgia and of the adjacent islands, were of this stock, but being among the first to feel the influence of Europeans, having come in contact with the Spaniards early in the sixteenth century, they soon lost their primitive customs and later sought homes elsewhere. The same is true of the tribes which occupied the coastal plain northward, within the present state of South Carolina. These very early removed from the coast and settled far inland, evidently becoming allied or affiliated with other tribes. And for this reason our knowledge of the customs of the early inhabitants of the coastal region is limited to the few brief and often ambiguous statements of the first explorers of the coast. The Cherokee, the most important detached Iroquoian tribe, who claimed and occupied the hills and valleys of the southern Alleghanies, and the Siouan tribes of Virginia and North Carolina, had distinctive forms of burial which are to be mentioned in detail. And so it may be assumed the majority of ancient burials encountered in eastern United States represent the work of various tribes which were met by the first Europeans to penetrate their respective territories. Later burials are often easily distinguished from the more primitive forms, and in certain cemeteries it is possible to recognize the burials which took place after contact with the whites, not only by reason of the associated objects of European origin, but by the changed position of the remains.

Many early writers described the burial customs of the different tribes, and in recent years archeological investigations have tended, in many instances, to verify these references. Such investigations have made it possible to distinguish the customs of the various groups of tribes, and to see to what extent their natural environment led them to adopt the several methods of disposing of their dead, but in the development of the various forms heredity appears to have been as great a factor as environment.

Considering New England as a whole, the home of kindred Algonquian tribes, the primitive manner of burial was to place the body, after it had been closely flexed and wrapped in skins or bark, in a rather small pit. This system probably resulted from the great difficulty which must necessarily have been experienced by the people in making an excavation, as a grave of this form required much less labor than would have resulted from the making of one of sufficient size to hold an entire body in an extended position.

When, late in the autumn of 1620, the Pilgrims touched at Cape Cod, they landed to explore the country and to learn something of its

BUSHNELL—ABORIGINAL BURIAL

native inhabitants. Not far from the shore they discovered a small settlement, and nearby was a "great burying place, one part whereof was encompassed with a large Palazado, like a Church-yard." At another point they encountered caches filled with corn, and other similar pits which served as graves. Examining one of the latter they soon reached "two Boundles, the one bigger, the other lesser," which contained human remains. The larger held "the bones and skull of a man," the latter the remains of a little child.¹ The bundles also contained a quantity of powdered red oxide of iron (Fe_2O_3). Within the last few years many similar pit-burials have been discovered on the coast of Maine; these contained masses of the insoluble red oxide of iron and certain objects of native origin of an imperishable nature. Similar masses of red oxide were encountered in a cemetery excavated in 1913 near Warren, Rhode Island, in which objects of European origin were likewise discovered. From these occurrences it would appear that placing quantities of the powdered oxide in graves with the human remains was a recognized custom of the coast Algonquian tribes of New England at the time of first contact with Europeans. Later, after coming under the influence of the missionaries and traders, the same people ceased their primitive pit form of burial and placed the remains in an extended position, either wrapped in bark or deposited in crudely made wooden coffins. Such were the conditions revealed when the ancient "Fort Neck Burying Ground," near the site of the old Niantic fort in Charlestown, Rhode Island, was examined in 1912.

Closely flexed burials have been discovered in the valley of the Connecticut and elsewhere in New England, and two skeletons so placed were encountered in a single grave near South Hadley, Massachusetts.

A Munsee (Algonquian) cemetery recently uncovered near Montague, New Jersey, contained both flexed and extended burials, and consequently belonged to the transition period, the earlier graves being of the primitive form, the later containing various objects of European origin. Similar customs appear to have prevailed among the Algonquian tribes which at this time occupied the coastal plain of Virginia and Maryland. It is to be regretted that more is not known of the burial customs of the aborigines of the former region, the Powhatan Confederacy, with whom the first Virginia colonists came in contact. But among these people, according to Smith and other early writers, the bodies of the principal men were prepared and wrapped in white skins, then placed on elevated platforms within

¹ Cheever, G. B., *The Journal of the Pilgrims at Plymouth, New York*, 1849, p. 38.

HOLMES ANNIVERSARY VOLUME

mat-covered lodges, termed "temples" by these writers. Other interments were made in excavations, the bodies being bound about in skins or bark. The remains first placed in the "temples" were probably later deposited in graves, and in this connection it is remarkable that not more than two or three small cemeteries are known to have been encountered within the bounds of the ancient confederacy which extended over the greater part of tidewater Virginia.

The northeastern part of the present North Carolina was the home of the most southerly tribes of the Algonquian stock, among which were the Roanoke, the first tribe to become known to the members of the English expedition which landed on the island of Wococon during the summer of 1584. The watercolor drawings made at this time by John White, and now preserved in the British Museum, include one which bears this inscription: "The Tombe of their Cherounes or cheif personages their flesh clene taken off from the bones save the skynn and heare of their heads w^{ch} flesh is dried and enfolded in matts laide at their feete, their bones also being made dry or covered wth deare skynns not altering their forme or proportion. With their Kywash, which is an Image of wood keeping the deade." Ten bodies are here represented in an extended position, and at their feet are four folded mats as mentioned in the legend. Beneath the platform are two skins spread on the ground, and immediately in front is a small fire. The idol, or "their Kywash," is placed on the platform with the remains. The tombs erected by the Powhatan tribes were probably similar to this.

At the present time there stands near the shore of Scott lake, in the valley of the Santee about nine miles southwest of Summerton, Clarendon county, South Carolina, a conical mound of earth. Scattered over the surrounding area are many fragments of pottery and other traces of an Indian settlement, but the surface has been modified by freshets, and probably the greater part of the surface as it was during the period of Indian occupancy has been washed away or covered by alluvium. Other smaller mounds have probably disappeared. This evidently marks the position of one of the more important Santee villages, and in a direct line was a little more than sixty miles northwest of Charleston. The settlement may have been visited by Lawson during the early part of 1701, and it is even possible that the mound was the one to which he referred when he wrote: "Near to these Cabins are several Tombs made after the fashion of the Indians; the largest and chiefest of them was the Sepulchre of the late Indian King of the Santees, a Man of Great Power. . . . The manner of their Interment is thus: A Mole or Pyramid of Earth is

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raised, the Mole thereof being worked very smooth and even, sometimes higher or lower, according to the dignity of the Person whose Monument it is. On the Top there is an Umbrella, made Ridge-Ways, like the roof of an House; this is supported by nine Stakes or small Posts, the grave being about 6 to 8 foot in Length, and Four Foot in Breadth; about it is hung Gourds, Feathers, and other suchlike Trophies, placed there by the dead man's relations, in Respect to him in the Grave."¹ The narrative then describes the manner of preparing the body for burial. How, after being left for a few days, it was embalmed "with a small root beaten to powder, which looks as red as Vermillion; the same is mixed with Bear's Oil to beautify the hair." Later it was covered with the bark of the pine or cypress "to prevent any rain to fall upon it."

The Santee, to whom the preceding notes refer, was the most southerly of the Siouan tribes. Others of this stock extended northward in the piedmont area as far as the Potomac, and included the Monacan confederacy in the present state of Virginia. Here the eastern boundary of the Siouan territory extended approximately to a line connecting the falls of the Appomatox, James, Rappahannock, and Potomac. Eastward to the coast were the Powhatan tribes. Within the ancient territories of the Monacan have been discovered various mounds containing large quantities of human remains, bearing evidence of a communal form of burial practised by these tribes. The best known of these mounds formerly stood near the right bank of the Rivanna, in Albemarle county, Virginia, a short distance north of the University of Virginia. This was carefully examined by Jefferson a short time before the Revolution, and was later described in his *Notes on the State of Virginia*. Originally it was about forty feet in diameter and twelve feet in height, "and round the base was an excavation of five feet depth and width, from whence the earth had been taken of which the hillock was formed." It contained several strata of bones, placed without order or any attempt at regularity, and between the deposits of human remains were masses of earth which had evidently been removed from the surrounding ditch, as suggested by Jefferson. Each stratum of bones may be considered as representing one communal burial, all placed there at one time. After each ceremony, which undoubtedly attended the burials, earth was strewn over the bones and thus the mound attained a height of twelve feet or more. Although all traces of this tomb have long since disappeared, the site is even now designated as "The Indian Grave".

¹ Lawson, John, *The History of Carolina*, London, 1714 (reprint, Charlotte, N.C., 1903), pp. 9-10.

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In this connection it is interesting to know that this term, so often encountered in Virginia and other parts of the South, referred to a mound or communal burial, and not to a single grave as might be supposed. There is little doubt that this mound was reared within a few generations of the time it was examined by Jefferson, as in writing of mounds in general, but of this one in particular, he said: "But on whatever occasion they may have been made, they are of considerable notoriety among the Indians; for a party passing, about thirty years ago, through the part of the country where this barrow is, went through the woods directly to it, without any instructions or enquiry, and having staid about it some time, with expressions which were construed to be those of sorrow, they returned to the high road, which they had left about half a dozen miles to pay this visit, and pursued their journey." It is reasonable to suppose that among this party were some whose forefathers were buried in this communal tomb, as these and no others would have retained knowledge of the site, and made a pilgrimage to it. Other mounds within the same territory are known to have been visited at a much later day by other parties of Indians, but whence they came is not known. A mound, evidently similar in all respects to the preceding, stood on the right bank of the Rapidan, about one mile east of the boundary between Orange and Greene counties, twenty miles northeast of the "Jefferson" site. It is supposed to have contained the remains of at least one thousand individuals, men, women, and children, deposited without order and at varying levels. It is of interest to know that no ornaments or objects of any sort were associated with the burials in either mound, and in this respect the communal burials of the South differed essentially from those of the northern Iroquois.

The islands lying off the coast of Georgia were, as already mentioned, the home of the ancient Yamasee. Many burial mounds standing on the islands and neighboring mainland have been examined, resulting in the discovery of several forms, or rather methods, of disposing of the dead. A mound of exceptional interest stands about two miles from Sutherland Bluff, on Sapelo river, McIntosh county, Georgia. When examined it was less than six feet in height and about forty-six feet in diameter. "The mound was composed of rich, loamy, brown sand with many local layers of oyster shells. The usual charcoal and fireplaces were present. A black layer from three inches to one foot in thickness, made up of sand mingled with charcoal in minute particles ran through the mound at about the level of the surrounding territory." Human remains were discovered at thirty-six points, and "in no one mound investigated by us has there

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been so well exemplified the various forms of aboriginal disposition of the dead—the burial in anatomical order; the burial of portions of the skeletons; the interment of great masses of human bones; the pyre; the loose deposit of incinerated remains; the burial of cinerary urns.”¹ Probably few mounds yet explored have revealed such a great variety of burials and presented such indisputable evidence that a tribe often followed, at the same time, many methods of disposing of their dead.

A short distance northward from the last, on Ossabaw island in Bryan county, stood a low, spreading mound. This was examined by Mr Moore and proved of special interest. In describing it he wrote: “It will be noticed that in no part of the mound, outside of the calcined remains, among which were parts of adult skeletons seemingly belonging to males, were skeletal remains of adult males—the skeletons being exclusively those of women, adolescents, children, and infants—and that in one portion of the mound burial vases exclusively contained skeletons of infants, unaffected by fire, while in other portions cinerary urns were present filled with fragments of calcined human skeletons. Again we see pockets of calcined human remains and skeletal remains of women and of children unaffected by fire and not included in vessels of earthenware.”² The lack of adult male skeletons in this mound tends to verify, to a certain extent, the statement made by Oviedo during the early part of the sixteenth century, when he referred to the people of this region. In mentioning the burial customs he drew attention to the unusual custom of placing the remains of the children and young persons apart from the others; and that the principal men of the tribe were buried in a distinct group. He failed to mention the disposal of the remains of the women, but they may have been placed with those of the children, as they have been revealed within this mound.³

It is possible within this area to trace another custom from the historic back into prehistoric times, and every such instance tends to make more clear the origin of particular aboriginal remains. About the year 1730 a small group of Creeks, together with a few Yamasee, settled on the south bank of the Savannah, at Yamacraw bluff, within the present city of Savannah. Their chief was the famous Tomochichi, who, together with others, later accompanied Governor Oglethorpe to England. While there, in 1734, a member of the party died of smallpox, and “previous to interment in the church-yard of St. John’s, Westminster, the body was sewn up in a blanket and bound

¹ Moore, C. B., Certain Aboriginal Mounds of the Georgia Coast, *Journ. Acad. Nat. Sci. of Phila.*, 1897, p. 45.

² Moore, *ibid.*, p. 89.

³ Oviedo, *Historia General y Natural de las Indias*, Madrid, 1853, p. 630.

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between two boards.”¹ It was then placed in a grave, with many ornaments and other objects. Moore drew attention to this occurrence when describing burials encountered by him in a mound on Creighton island, McIntosh county, a short distance south of Savannah, and consequently not far from the former village on Yamacraw bluff. He remarked on the discovery of traces of wood associated with the skeletal remains, and said: “In seven cases layers of decayed wood or bark, occasionally showing marks of fire, lay above human remains, and in two cases, above and below.”² There is little doubt of these mound burials having been similar, in all essential details, to that of the Indian who died in London in 1734.

Farther south, in Florida, was the ancient territory of the Timucuan tribes, which occupied the greater part of the northern half of the present state, extending southward to the vicinity of Cape Cañaveral, thence across the peninsula to the western coast, reaching the latter near the southern shore of Tampa bay. Within this area are many mounds and other traces of aboriginal occupancy, some of which may, however, precede the coming of the Timucuan group. But it was the custom in this region to bury the dead in mounds, many of which have been carefully examined.

Near the center of the peninsula, in the present Lake county, is a region which appears to have been comparatively thickly settled. Here are many mounds, shell deposits, and other evidences of the occupancy of the country by native tribes. Some mounds when examined have revealed unusual features. One, about two hundred yards from the right bank of Blue creek, was practically demolished. “Its height was 5.5 feet, its circumference 165 feet. . . . About one foot beneath the surface of the mound, which was otherwise composed of white sand of the surrounding territory, ran a layer of pinkish sand, having a maximum thickness of eighteen inches. . . . Chemical analysis showed the coloring matter to be pulverized hematite.” Burials were encountered only beneath the unbroken stratum of pink sand. “They were mainly on or below the base and were all disconnected bones, crania greatly preponderating.” A mound somewhat smaller than the preceding, and about two miles distant from it, contained many curious burials. “In all, thirty crania were met with. . . . At times bundles of long bones were found without the skull, while in other portions of the mound fragments of isolated crania were encountered. At times great bunches of long bones were found with two or three crania in association. . . . Most skeletons

¹ Jones, C. C., *Antiquities of the Southern Indians*, New York, 1873, pp. 185-187.

² *Op. cit.*, p. 30.

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lay near or upon the base." No extended remains were met with. As in the north, the later burials were made in an extended position, and it is also of interest to know that mounds continued to be constructed in this part of Florida after the coming of Europeans. Such a work was discovered and examined by Mr Moore about one mile northwest of Fort Mason, just south of Lake Yale. It was two feet in height and fifty feet in diameter, and had been reduced by cultivation. "Unlike other mounds demolished by us on the Oklawaha, the method of burial in this mound was in anatomical order, in various forms of flexion. In all fifteen skeletons were encountered." Objects of iron, silver, and copper were discovered, and "three skeletons had each one polished stone celt in association." Stone arrowheads were likewise found. The entire mound was erected after contact with Europeans.¹ The mound probably dates from the transition period, before the native stone implements and weapons had been entirely superseded by others of European origin. Although this was not far from the site of a late Seminole settlement, it would seem that the mound belonged to a somewhat earlier period, as it is doubtful if these people would have had and evidently used stone implements.

The Aucilla (Ocilla) river formed the northwestern boundary of the Timucuan territories, and beyond were probably Muskhogean tribes whose identity has not been clearly established. To these tribes may be attributed the mounds in the vicinity of the lower Apalachicola. A mound, nine and one-half feet in height and eighty feet in diameter, stood about two hundred yards north of Alligator Harbor and one mile from its lower end, and when it was excavated, "seventy-nine burials were noted by us, including the flexed; the bunched, which sometimes had several skulls; the lone skull; and scattering bones." All burials were in the southeastern half of the mound, and within the same section were sixty-two pottery vessels, and many objects of stone and shell.² This site is in Franklin county, and the mound undoubtedly antedates European contact; but in Calhoun county, which adjoins Franklin on the west, was a mound on the northern bank of Chipola cut-off which belongs to a later period, as glass beads and pieces of brass found at the base of the mound indicate the entire work to have been erected since European contact. Burials, forty-two in number, were scattered throughout the mound, and these included flexed skeletons, bunched burials, and lone skulls.³

¹ The preceding references to mounds in Lake county are from Moore, C. B., in *Journ. Acad. Nat. Sci. of Phila.*, x, 1895.

² Moore, C. B., Certain Aboriginal Mounds of the Central Florida West-coast, *Journ. Acad. Nat. Sci. of Phila.*, xii, 1903, pp. 257-265.

³ Moore, *ibid.*, pp. 445-466.

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But it is not possible to say that both mounds were erected by the same people, although it is highly probable they were, as similar forms of burial were found in both. The occurrence of many skulls, dissociated with other bones, in mounds of central and northern Florida, presents one of the most interesting questions in connection with the study of the burial customs of the ancient inhabitants of this region.

The greater part of Mississippi, Alabama, and Georgia was claimed and occupied by various tribes of the Muskogean stock. On the west were the Choctaw, who extended over a large part of Mississippi and eastward into Alabama. In early times, before the influence of French missionaries had been exerted to a degree sufficient to change their primitive customs, the Choctaw placed the bodies of their dead upon elevated scaffolds away from their habitations. Later all traces of the flesh were removed from the bones, which were then deposited in mounds of earth. Little is known of the ceremonies which were probably enacted at the time of the second disposition of the remains. At the present time the Choctaw follow the methods of their white neighbors and bury in graves, a custom which the southern members of the tribe appear to have acquired about four generations ago.

The Creeks, to the eastward of the Choctaw, and the Chickasaw to the northward, buried their dead in excavations made beneath the floors of their dwellings which they continued to occupy, the space above the grave being covered by a bed or table. Very different were the habits of the Natchez, Taensa, and Timucuan peoples, who usually destroyed the dwellings of the deceased.

The very elaborate ceremonies enacted by the Natchez at the time of the death of a chief have been minutely described by early French writers. Human sacrifice was an important feature of this strange formula. The body of the chief, after being properly prepared, was carried by a circuitous route, and with much pomp and ceremony, to the temple, where it was deposited.¹

The temple of the Natchez at once suggests the rather similar structure of the southern Algonquian tribes of Virginia and Carolina. Other southern tribes appear to have had places of the same nature, used to hold the dead before their final disposal, but probably of less importance than was the structure of the Natchez.

The burial mounds of piedmont Virginia, justly attributed to the Siouan tribes, prove beyond doubt that all the flesh had been removed from the bones before burial. But no records have been preserved of

¹ For the various accounts of the Natchez ceremony, consult Swanton, *Indian Tribes of the Lower Mississippi Valley*, *Bulletin 43, Bureau of American Ethnology*, Washington, 1911, pp. 138-157.

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the ceremonies attending the death and the subsequent disposal of the remains of members of these tribes. But the customs of the Virginia tribes may have been rather similar to those of the far distant though kindred Biloxi, who at one time lived on the Gulf coast of Mississippi. Butel Dumont, in describing these people as they were during the early part of the eighteenth century, wrote in part: "The Paskagoulas and the Billoxis never inter their chief when he is dead, but they have his body dried in the fire and smoke so that they make of it a veritable skeleton. After having reduced it to this condition they carry it to the temple (for they have one as well as the Natchez) and put it in the place occupied by its predecessor, which they take from the place which it occupied to place it with the bodies of their other chiefs in the interior of the temple, where they are all ranged in succession on their feet like statues."¹ The remains may later have been deposited in mounds, many of which have stood within this region.

The Cherokee, the great detached Iroquoian tribe whose home during historic times has been among the hills and valleys of the southern Alleghanies, usually placed their dead on a hilltop and covered the body with a heap of stones of varying sizes. The numerous cairns of this mountainous district are of Cherokee origin. But no such custom prevailed among the Iroquois, who have occupied for many generations the central and western parts of the present state of New York. Within recent years ossuaries have been discovered in the western counties of the state; these contain vast quantities of skeletal remains, together with great numbers of objects of native origin. They appear to have been rectangular in form, to have occupied a rather prominent position, and to have been carefully prepared. Such a communal burial place was discovered in May, 1909, about one mile southwest of Gasport, Niagara county, but unfortunately no detailed record was made of its contents. However, it is within reason to suppose it to have been similar to the communal burial so clearly described by Père Le Jeune, in the year 1636, somewhere in the vicinity of Lake Simcoe. The day having arrived when the great burial was to take place, and the people having come together from distant villages bearing the remains of their dead and the numerous presents or offerings to be placed in the grave, the ceremony was soon enacted. "Let me describe the arrangement of this place. It was about the size of the Place Royale at Paris. There was in the middle of it a great pit, about ten feet deep and five brasses wide. All around it was a scaffold, a sort of staging very well made, nine to ten brasses

¹ Quoted by Swanton, *ibid.*, p. 7.

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in width, and from nine to ten feet high; above the staging there were a number of poles laid across, and well arranged, with cross poles to which these packages of souls [bodies] were hung or bound. The whole bodies, as they were to be put in the bottom of the pit, had been the preceding day placed under the scaffold, stretched upon bark or mats fastened to stakes about the height of a man, on the border of the pit. . . . They unfolded also their parcels of robes, and all the presents they had brought, and hung them upon poles, which were from 5 to 600 toises in extent; so there were as many as twelve hundred presents which remained thus on exhibition two full hours, to give strangers time to see the wealth and magnificence of the country."¹ The sides and bottom of the pit were lined with beaver robes, forty-eight in number, each formed of ten skins. Many of the bodies were wrapped in similar robes. Various objects were placed with the remains, including three large kettles which were deposited near the center of the pit. This ceremony was witnessed among the Hurons, and although ossuaries were not made by the Cherokee, the southern Iroquoian tribe, small pits which have been found to exist beneath the cairns attributed to this people may, in some manner, be associated with the great burial pits of the north.

The extensive stone-grave cemeteries of Tennessee and parts of Kentucky were probably the work of the Shawnee. In the majority of the graves the bodies had been placed in an extended position, but in others the bones alone had been deposited after the flesh had been removed. Similar graves occur northward along the Mississippi to beyond the mouth of the Missouri, up the valley of the Ohio into Pennsylvania, western Maryland, and Virginia. They have been traced along the course of the Tennessee river into Alabama, and a few scattered stone-lined graves have been discovered in northern Georgia. They do not indicate the custom of a single tribe, but rather prove the presence of a material suitable for their construction. It is known that the Kaskaskia, and probably other Illinois Indians, constructed stone-lined graves on the bluffs near the Mississippi, at the mouth of the Kaskaskia, in the early part of the last century, and other similar burials may be equally modern. The Kaskaskia, before their removal southward in 1703, occupied a site on the upper Illinois river. Their village and stone-grave cemetery were destroyed by the Iroquois early in 1680.

Burial mounds, isolated and in groups, are more numerous north of the Ohio than in the southern country. And along the bluffs

¹ Jesuit Relations, vol. x, Cleveland, 1897.

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bordering the numerous streams are often extensive groups of burials, while others are situated in the lowlands and are exposed by freshets. The Algonquian tribes which formerly occupied the rich prairie lands of Indiana, Illinois, and the southern parts of Michigan and Wisconsin, seem to have followed various methods of disposing of their dead, no one of which appears to have been distinctive or characteristic of a single tribe. And in no part of the country east of the Mississippi did the native tribes remove from place to place to such a degree as did the people of this region. Therefore it is not possible within the limits of a short article to refer in detail to the various forms of burial encountered in this wide area. The great mounds of southern Ohio, with their altars and traces of great fires associated with human remains, reveal a little of the ceremonies which attended the burials. And it is quite apparent that the ceremonies performed by these ancient people, evidently the builders of the remarkable earthworks of the region, were among the most elaborate conducted by any of the eastern tribes.

Future investigations of mounds and burial places will probably serve to make clear other customs of the early occupants of the country east of the Mississippi, but unfortunately all such traces are rapidly disappearing and within a century few signs will remain of the native tribes which occupied the region when it was first traversed by Europeans.

WASHINGTON, D.C.

Parallels in the Cosmogonies of the Old World and the New

By I. M. CASANOWICZ



FROM the earliest times men have shown curiosity in regard to the origin of things that lie about them, and an impulse to find some solution for the mysteries which they daily witness. In the presence of heaven and earth, trees and rivers, sun, moon, and stars, beasts and human beings, they have felt the necessity of accounting for all these objects. Cosmogonies, or theories respecting the genesis of the visible universe, and the manner and order in which the various forms of life came into being, are therefore found among nearly all races. They are mostly spontaneous productions of the folk-fancy and are therefore unsystematic and disconnected, and the explanations which they offer are often crude, childish, and even grotesque; but they furnish an important contribution to the history of early opinion, scientific and religious. The questions which the primitive peoples ask and answer, as best they can, in these myths are usually the same that we ourselves are asking and endeavoring to answer in our scientific studies. Take as an instance the most generally known account of beginnings, that in the opening chapters of the book of Genesis, which undertakes to answer such questions as: "Whence come heaven and earth and their fulness? Whence are man's body and mind? Whence his reason and mortality? Whence his language? Whence the love of the sexes? Whence does it come that woman brings forth with pain, and man must gain his bread from the stubborn soil by the sweat of his brow?" and so on.

Thus we find in these tales the beginnings of human science, humble beginnings, to be sure, but just on that account venerable and attractive, nay, touching, because in them the ancient peoples have sometimes revealed their most intimate feelings, their fears and hopes, clothing them in the bright garb of poetry.

Out of the multifarious and variegated speculations on this subject, a few more or less kindred conceptions in traditions of the Old and New Worlds will be pointed out in the following notes.

CASANOWICZ—COSMOGONIC PARALLELS

I. A PRIMEVAL WATER-CHAOS AS THE PRIUS OF THE EXISTING WORLD

Common to nearly all races is the opinion that before the present order of things water held all things in solution. We begin with the Babylonians.

The Babylonian story of creation is a kind of epic, composed in poetic diction and supposed to have covered seven clay tablets. Of most of them only fragments thus far have come to us. Considerable lacunæ, however, have been filled from parallel sources. The poem begins with the declaration that in the beginning, before heaven and earth were created, there was a primeval ocean flood; this is personified as a male and a female being:

“When above the heaven was not named,¹
When below the earth was not named,
Apsu, the generator of them,
Mummu Tiamat, the mother of all of them—
Their waters combined together,
When fields were unformed, sprouts had not come forth,
When of the gods no one had arisen,
When no name had been named,
No destinies had been fixed—
Then gods were created.”

Hatred of the new-born light causes Tiamat (represented in Babylonian art as a dragon or griffin) to rebel against the gods. Some of the gods side with her, and to aid her in her fight she produces huge monsters. At the request of the other gods in solemn assembly Marduk (Merodach), the god of light, offers to subjugate her on condition that the supreme rule over heaven and earth be accorded to him. He equips himself with the necessary weapons, a simitar and a bow, and rides in a chariot to meet Tiamat and her crew. He overcomes her by forcing open her mouth, which he fills with a hurricane so that she bursts in twain, and puts her crew in chains. He then divides her carcass, out of half of which he creates heaven, out of the other, earth.

The story reflects the climatic conditions of Babylonia. In fact, it is a mythic description of one of the most familiar natural phenomena of the Euphrates valley. During the long winter the Babylonian plain looks like a sea (Tiamat), owing to the heavy rains. Then comes spring, when the god of the vernal sun (Marduk) and the winds divide and subjugate the waters. So, the Babylonian fancy assumed,

¹ That is, did not exist. To have a name, according to ideas widely prevalent in antiquity, was to exist; per contrary, non-existence is indicated by the term lessness.

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it must have been in the first spring when, after the battle between Marduk and Tiamat, the organized world came into being.

The Hebrew account of creation is somewhat like a pale copy of the Babylonian: Before heaven and earth were separated, there was a dark water waste (Tehom = Tiamat). From this, God called forth light, and then divided the waters; the upper waters he shut up in heaven, and on the lower he established the earth (Genesis, I, 2-8).

In ancient Egypt different theories regarding the beginning of the world were held in the individual priestly colleges. The most widespread of all, probably worked out in Heliopolis (the Biblical On), was that in the beginning there was a great primordial body of water, personified under the name Nun, which contained all male and female germs of life. Out of it issued Ra, the sun-god. In this water, too, lay the earth-god Keb, and the heavenly goddess Nut, locked in close embrace until the god of the atmosphere, Shu, parted them from one another and carried the goddess of heaven in his arms to the upper regions.¹ In Egyptian art Shu is sometimes represented upholding Nut over his head.

Turning to the cosmogonies of the New World, Müller has pointed out as a characteristic of the culture stage of the "redskins that they do not speak of the creation of the world as a whole, but of the earth as solid land in contrast to the water which they conceive as primal and as having existed from eternity."²

According to the myth of the Achomawi,³ "at first there existed the shoreless sea and the clear sky. A small cloud appeared thereupon, which gradually increased in size until it became the silver-gray fox, the creator. Then arose a fog which, condensing, became Coyote." Similarly the Maidu set at the beginning "only the great sea, calm and unlimited, to which, from the clear sky the creator came, or on which he and Coyote were floating in a canoe."⁴

The Hopi myths likewise assume water as primal. "In the under-world there was nothing but water; two women, Huruing Wuhti of the East and Huruing Wuhti of the West, . . . decided to create land and they divided the waters that the earth may appear."⁵

The Zuñi tales of the origin of the world remind one of the metaphysical and mystical conception of a gradual emanation of the material world from the substance of the deity which is found in the

¹ Georg Steindorff, *The Religion of the Ancient Egyptians*, p. 35 f.

² J. G. Müller, *Geschichte der amerikanischen Urreligionen*, p. 108.

³ I am largely indebted for many of the references to the cosmogonic myths of the New World to the articles of Lewis Spence and Robert H. Lowie in Hastings' *Encyclopædia of Religion and Ethics*, IV, 126-128 and 168-174.

⁴ J. N. B. Hewitt in *Handbook of American Indians*, I, 972.

⁵ Hartley Burr Alexander, *Mythology of all Races*, vol. X, North American, p. 204.

CASANOWICZ—COSMOGONIC PARALLELS

Neo-Platonic philosophy and the Jewish Kabbalah; Awonawilona conceived within himself and projected creative thoughts¹ into the void of night, whereby mists of increase, steams of potent growth were evolved and uplifted. Thus by means of his innate knowledge the All-container made himself in person and form of the sun . . . with his appearance came the brightening of the spaces with light, and with brightening of the spaces the great mist clouds were thickened together and fell, whereby was evolved water in water; yea, and the world-holding sea.² With his substance of flesh outdrawn from the surface of his person he formed the seed-stuff of the two worlds, impregnating therewith the great waters . . .³

The Iroquois let the earth come out from the water through the falling into it of the original ancestress, or the digging of an amphibious animal (beaver, otter, or muskrat); while according to the Athapascans, the descent of a raven brought up the earth to the surface of the ocean.

The conception of the original oneness of heaven and earth which subsequently were separated or forced apart, which we meet in the myths of the Old World, is also found in Polynesia and New Zealand. In Riatea a monstrous cuttlefish held the earth and the heavens together, but he was killed by the sun-god Maui, whereupon the sky rose up to heaven. On the shoulders or back of this god the earth rests; and when he moves the earth quakes.⁴ The New Zealand tale has earth and heaven "cleave together". Tane, the father of forests, birds, and insects, firmly planted his head on his mother, the earth, his feet he stemmed against his father, the skies, and separated heaven from earth, so that they were rent apart, and darkness was made manifest, and so was light.⁵

An interesting parallel to, or rather illustration of, the expression in Genesis, I, 2, "And the spirit (or breath⁶) of God was brooding over the surface of the waters," is supplied by the myths of the Muskhogean and the Polynesians. In the former is related: "Before creation a great body of water above was visible. Over the dreary waste two pigeons flew to and fro, and at last dropped a blade of grass rising

¹ Cf. Psalm xxxiii, 6 and 9: "By the word of the Lord were the heavens made, and all the host of them by the breath of his mouth. For he spake and it was done, he commanded and it stood fast."

² Cf. in the second Biblical account of creation Genesis, II, 5 f.: "And no plant of the field had yet sprung up, for the Lord God had not caused it to rain upon the earth and there was not a man to till the ground. But there came up a mist from the earth and watered the whole face of the ground."

³ Alexander, *op. cit.*, p. 207; Handbook American Indians, I, 971.

⁴ Louis H. Gray in Hastings' *Encycl. Relig. and Ethics*, IV, 175.

⁵ W. M. Flinders Petrie, *ibid.*, p. 125.

⁶ The Hebrew word *rûāḥ*, like Greek *πνεῦμα* (pneuma), means wind, breath, spirit.

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above the surface. Dry land gradually followed, and the mainland and islands took their present shapes."

The Polynesians represent Tangaloa, god of heaven and the atmosphere, as a bird which hovered over the ocean waters and there deposited an egg, and the two halves of the shell formed the heaven and the earth, while the smaller fragments became the islands.¹ It may be that in the original story used by the author of the Genesis creation account, the deity was likewise represented as a bird and that this trait was eliminated by the monotheistic tendency of the Bible. It is well known that the Holy Spirit, as the third person of the Trinity, is described (Matthew, III, 16) and pictured as the symbol of a dove. The suggestion of a bird (dove) in this passage was already pointed out by the Jews. In the Babylonian Talmud, Tract Hagigah, 15a, a rabbi commenting on it says, "like a dove which hovers over its young without touching them."

II. THE WORLD-EGG

We have referred to the Polynesian idea of the formation of heaven and earth from an egg. This symbolism also figures in the cosmogonies of the Old World. Indeed, the egg is one of the most widespread mythic symbols, as it fully and simply reveals the process of birth, or coming into being, while the two halves of its shell obviously lend themselves as representations to the vaulted heaven and the rounded earth.

Perhaps the earliest use of the egg symbol was made in Hindu cosmogony: On the primal water floated the golden cosmic egg; out of this came the creator, Brahma; from the two halves of the egg he created heaven and earth, and between them the atmosphere, and so forth.²

In the Phœnician cosmogony as known from the fragments of Philo Byblius (*ca.* 100 A.D.), Mot (Tiamat?), which was the result of the union of the male and female principles, was egg-shaped. Khousor split the egg in twain, whereupon one of the pieces became the heavens and the other the earth.

The Orphics, similar to the Hindus, let the creator, Protogonos or Phanes, be born from the world-egg.³

In Egypt, too, the first creative act begins with the formation of an egg. Out of Nun (the primeval water chaos) emerged an egg from

¹ L. H. Gray in Hastings, *op. cit.*, p. 174.

² Cf. A. E. Wollheim da Fonseca, *Mythologie des alten Indien*, p. 9; E. W. Hopkins, *The Religions of India*, p. 208.

³ Arthur Fairbanks, *Handbook of Greek Religion*, p. 245; cf. William Sherwood Fox, *The Mythology of all Races*, vol. I, Greek and Roman, p. 5.

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which came out, in the form of an infant, Ra, the sun-god, who brought light and life into the world, and created the other gods and beings.

III. A MULTIPLE OR STORIED UNIVERSE

"All the American tribes recognize a world above the heavens and a world below the earth. Many of them multiply these worlds. Thus the Bella-Coola believe in a five-storey universe, with two above and two below our earth. Four worlds above and four below is a recorded Chippewa and Mandan conception, and in the South-West the four-storey underworld is the common idea."¹ Dr Alexander finds the "root of the idea in the conception of the four cardinal points of the quarters of the world, from which came the ministering genii when the earth was made, and in which these spirits dwell, upholding the corners of the heavens."²

To the sacred four of the Indians corresponds, among the Semites, seven as the most sacred number, and so Jewish post-Biblical tradition knows of seven heavens, while the Mohammedans believe in the existence of seven heavens and seven earths as dwelling-places of the several orders or classes of beings. Both these traditions specify the inhabitants of each story; they lay down the distances between them and the diameter and thickness of each, and (the Mohammedan) the substance of which each is constructed, with much precision.

The Jewish seven heavens are: (1) *Velon* (curtain), which is rolled up and down to enable the sun to go in and out; (2) *Rakia* (firmament), on which the sun, moon, and stars are fixed; (3) *Shehakim* (clouds), in which are the millstones to grind manna for the righteous; (4) *Zebul* (palace), the upper Jerusalem with its temple; (5) *Maon* (dwelling), in which live the classes of ministering angels; (6) *Makon* (foundation), in which are the treasuries of snow and hail, the chambers of dew, rain, and mist behind doors of fire; (7) *Araboth* (plain), where justice and righteousness, the treasurers of life and blessing, the souls of the righteous, and the dew of resurrection are to be found. There are the angels upholding the throne of glory, and over them is enthroned the great King.³

The seven heavens of the Mohammedan tradition are: (1) of pure virgin silver, which is Adam's residence; (2) of pure gold, which is that of John the Baptist and Jesus; (3) of pearls, which is Joseph's; (4) of

¹ H. B. Alexander, *The Mythology of all Races*, etc., p. 275; cf. also pp. xxiii, 23, and 105.

² *Ibid.*, p. 23; cf. p. 285.

³ *Bab. Talm.*, Tr. Hagigah, 12, 13a; cf. II Corinthians, xii, 2, where Paul speaks of having been "caught up even to the third heaven." That the conception of a plurality of heavens was already familiar to the Biblical authors is evinced from the expression "heaven of heavens," Deuteronomy, x, 14; I Kings, viii, 15; Psalms, cxlvi, 4.

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white gold, which is Enoch's; (5) of silver, which is Aaron's; (6) of ruby and garnet, which is Moses'; (7) which is Abraham's. The seven earths are occupied (1) by men, genii, and animals; (2) by the suffocating wind; (3) by the stones of hell; (4) by the sulphur of hell; (5) by the serpents of hell; (6) by the scorpions of hell, and (7) by the devil and his angels. The distance between, and the diameter or thickness of each heaven and each earth respectively, is five hundred years' journey.¹

IV. THE CREATION OF MAN

Nearly all popular traditions consider mankind as a product of the gods.

In the first Biblical account the creation of man is summarily stated as having been "made in the image of God" (Genesis, I, 27). In the second account (Genesis, II, 7), the creation of man is more particularly described. After the soil had been prepared by moisture, "God formed man of the dust of the ground, and breathed into his nostrils the breath of life, and man became a living being [or living soul]."

A similar view is found in the Babylonian account of Berosus²—the clay was mixed with the blood flowing from the severed head of the dragon Tiamat.

On some of the Egyptian monuments, Khnum, the tutelary deity of Elephantine, is represented molding clay wherewith to form man upon the potter's wheel.

In the Mohammedan tradition God had some difficulty in the creation of man: the angels objected, and the earth refused to supply the necessary clay. Finally the Angel of Death succeeded in bringing earth of various colors, hence the varying colors among men.

An almost exact parallel to the description of the creation of man in Genesis, II, 7, is, according to Müller, found in the myths of the Onondaga Iroquois: "The Great Spirit made two images of clay and enlivened them by the breath of his mouth. The first received the name of first man, the second, of helpmeet" (*Gefährtin*; cf. Genesis, II, 20).³

The molding of man from clay is held also by Muskhogean Indians, while according to the ancient Quiche man had to be made over three times. First man was created of clay which dissolved in the water. Then he was made of the wood of one tree, and woman from the sap of another; but they lacked intelligence and lived like brutes; showers

¹ Thomas Patrick Hughes, Dictionary of Islam, pp. 102, 170; cf. Jewish Encyclopedia, IV, 340.

² Berosus was a Babylonian priest who lived under Alexander the Great. He wrote, in Greek, three books of Babylonian history, entitled Chaldaika or Babyloika, of which only some extracts, preserved principally in the writings of Josephus, Clement the Alexandrian, Eusebius, and Syncellus Gorgios, have come to us.

³ Gesch. d. Amer. Urr., p. 110.

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of pitch and wild animals destroyed them. At last four perfect men were created of yellow and white maize, who were endowed with intelligence. While these were asleep, the gods created four women for them (cf. Genesis, II, 21).

The employment of some kind of wood in making man is also related in the myths of the Maidu of California and the Arawak of Guiana. In the Old World this belief is found in Norse mythology, which teaches that human beings were drawn forth by the gods from the trunks of trees.¹

V. CULTURE HEROES, OR TRANSFORMERS

In many of the Indian myths there are tales or anecdotes of a class of beings that stands on the border-line, as it were, between divine animals, spirits, and gods: they are the various kinds of beings that appear sometimes in animal form, sometimes in the form of humans to whom are credited the setting in order of the shapeless world, the conquest of monstrous beings, the establishment of the institutions and arts of life, and sometimes also the creation of various things. In some cases this personage is a mere trickster and mischievous being, whose actions, if they result in advantage to mankind, are contrary to his intentions, like Mephistopheles in Goethe's *Faust*, the spirit that wills evil but works good. Such are the coyote, the raven, the rabbit, the mink, and the bluejay. In other instances he appears in a more dignified form as a benevolent helper and organizer. Such are Yetl of the Athapascans, who saved their ancestors from the flood and brought them fire from heaven; Kodoyanpe of the Maidu, who with the assistance of the "conqueror" destroyed many monsters and evil beings. Further, Joskeha of the Iroquois, and Poshaiyankya of the Zuñi. Just as the conception of the creator-gods is to account for the beginning of the world, so also that of these beings is to account for the beginning of certain conditions in the world, and the distinction made between them is to account for the presence of good and evil elements in the world.

One of the fragments of Berosus gives the following account of the beginning of civilization in the valley of the Euphrates:

In the first year there appeared from that part of the Red sea which borders on Babylonia an animal endowed with reason by name of Oannes. Its body was entirely that of a fish, but under the fish's head it had grown out another head, while the feet were those of a man grown out from the fishy tail. His voice and language were human. An image of it is still preserved. This being used to pass

¹ Stuhr, *Nordische Alterthümer*, p. 105; Grimm, *Deutsche Mythologie*, I, 337, quoted in F. Lenormant, *Beginnings of History*, p. 58.

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the day among men, without taking food, and he gave them the knowledge of letters, sciences, and various arts, taught them how to found cities, build temples, and establish laws; also how to measure land, to sow and gather the fruit—in general all that is proper for an ordered life, so that from that time on nothing material has been added by way of improvement to his instructions. At sunset Oannes submerged again into the sea and spent the nights in the deep, for he was amphibious. Later on other similar beings appeared. Oannes also delivered to the people a document on the origin of things and states.

Oannes is usually identified with Ea, the Babylonian god of the ocean deep. Also in the Babylonian pantheon he is the god of wisdom and arts—in short, the god of civilization and humanity. The Persian gulf, which to the Babylonians appeared as the beginning of the great ocean that flowed round the earth, was particularly sacred to him, and in this legend may be concealed a tradition that the Babylonian civilization started from the coast of the Persian sea.

The few parallels briefly presented in the preceding notes show that in spite of geographical separations, historical and cultural divisions, and the overgrowth of a luxuriant imagination, the theories of the production of earth and heaven, of men and other objects, exhibit substantially the same types everywhere. There is rarely, if ever, a conception of an absolute beginning. *Creatio ex nihilo* was no more comprehensible to the ancients than it is even to ourselves.¹ There was always a something, indeed there was a great deal, at the beginning; but there was no cosmic order. So that instead of a theory or a doctrine of “origins” we have a theory of evolution from chaos to an ordered universe. The more elaborate cosmogonies of civilized nations commonly begin with the conception of a formless mass of material out of which the gods arise and shape the world. In those of the less advanced peoples the preëxistence of world-matter is likewise assumed; sometimes, too, that of heaven as the seat of the earth-maker and that of preternatural animals, his coadjutors. Besides, a primordial water-body as the substratum of the world, a primeval cosmic egg, and the creation of man from clay, suggested by the action of the potter, seem to be well-nigh universal notions. The question of the migration of myths is a part of the larger questions of the migration of culture, the solution of which is outside the scope of these notes.

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¹ The belief in the creation of the world by God out of nothing is one of the fundamentals of orthodox Judaism, and it passed over as a dogma into Christian theology. But it is not expressly taught in the creation accounts of the book of Genesis. They say nothing in regard to the water chaos, whether it was eternal or made by God, and the Hebrew word *bārā* in Genesis, I, 2, which is rendered “created,” signifies primarily and etymologically to split, divide, or separate.

Samoan Kava Custom

By WILLIAM CHURCHILL



ENSTRUUM of manners, social solvent, kava occupies the most important place in the life of the Polynesian communities of the Pacific. In cases of physical exhaustion it goes very far indeed to neutralize the fatigue toxins and restores the wearied man to the enjoyment of his common life. Merely an infusion, wholly devoid of vinous fermentation or alcoholic distillation, it provides a beverage which cheers good society and leaves behind it no regret for intoxication. The central point of a ritual of ceremony wherever the Polynesians use this agreeable drink, it is in Samoa that we find its group of observances at the highest point of ornate ceremony.

Among many far more important records of kava ceremony I find a rapidly penciled memorandum on a scrap of paper. Brought once more to light after several years it is easy to recognize the word-for-word accuracy in this note, for that reason in particular I employ it for the purpose of presenting to view a simple kava meeting in the hamlet of Vaiala just outside my official windows.

Vaiala is a subordinate hamlet of the district of the Vaimauga on the north shore of 'Upolu and immediately east of Apia. It is not the seat of district government, that is properly in the hamlet of Mo'otā at the distance of a mile eastward and separated by two slight streams; but in conditions of Samoan life, which need not enter into this narrative, Vaiala has been for the better part of a century the place of abode of the ruling chief of the district rather than Mo'otā, although the definitive parliaments of the men of the Vaimauga must be held on the malae or village green of the latter place. The chief of Vaiala is Le Patū, but, except in matters distinctively relating to the hamlet, he is quite overslaughed by the presence of his superior, the district chief. Chief of the district is Tofaeono, a name which may readily be recognized in the narrative of Wilkes as Tufai, a turbulent chief four-score years ago whom it was found necessary to deport to Uvea, an ante-Christian scoundrel whom his descendants recall as a deplorably bad man who received less punishment than he merited. Manogia-manu is the hereditary speechmaker (*failauga*) of the Vaimauga and therefore the mouthpiece of Tofaeono. A visiting party (*malaga*) has been sojourning in Vaiala for the conventional three days and is about

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to depart over the southern mountain crest to its home in Vaie'e on the glistening white sands of the beach which stretches along for most of the south shore of 'Upolu. Visitors and hosts are gathered in the great guest house of Vaiala for the parting, it is early in the morning and the coconuts cast athwart the malae of Lelepa long shadows which dance upon the neat turf under the first draft of the refreshing trade wind. Within the house Tuiā, the Vaie'e chief, sits at the proper post in the front of the house (*pepe*), Tofaeono in the rounded end as befits the host sits at his due station, Manogiamanu in lesser rank sits in the house area near the central posts which support the lofty ridge-pole. From the belt-like roll whereby his loin cloth is cinched about his waist Tuiā draws three pieces of dried kava root, each about a finger length and of the girth of three fingers set together, holds the bits in his palm, gazes at them in hesitation and depreciation, throws them on the mats before him as matter of scant worth, and says in an apologetic tone:

Tuiā.

Nai fasi 'ava leaga ma le fa'atauva'a.

A few scraps of kava, poor stuff and of no account at all.

Tofaeono.

Soia le fetalaia! 'Ua manogi matuā
lelei fasi 'ava nei.

A truce, pray, to modest speaking.
Most delicious fragrance have these
scraps of kava.

Approaching humbly Manogiamanu picks up the kava, conveys it respectfully to Tofaeono, receives from him an equal amount of the root, returns to his station, where he declaims the formal proclamation of the kava in order that all may come near to share the pleasure.

Manogiamanu.

Iā! Fa'afogafoa ia 'outou susuga a
ali'i ma tapa'au 'ua aofia, 'o fasi 'ava
nei o le ipu a le afoa a Tuiā 'ua i
ai 'ia te a'u. O le ā te'a 'i lona aiga.

Iā! Give ear, ye lords and chiefs and
people of this town here gathered
together, these are the pieces of
kava of the cup of his Excellency
Tuiā which I have here. He is about
to depart for his own home.

The assembly individually in loud voice.

Fa'afetai mau 'ava, fa'afetai lava mau
'ava.

Thanks for thy kava, thanks indeed
for thy kava.

When the kava has been chewed, macerated, proved of the right strength, and strained, the director of the bowl, the chief's son (*manaia*), who is somewhat in the position of heir-apparent, proclaims the readiness.

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Manaia.

Talatalanoa pea, tapa'au e afio na,
'a 'o le 'ava taute o le fesilafaiga 'ua
matou sui i vai se'ia usi ane i le
fa'asoaso.

Continue the informal conversation
if you will, but the kava drink of
social remembrance we dilute with
water until it is strained for serving.

The assembly, following the cry with clapping of hands.

Iā, fa'asoa ia ma se manuia.

Iā, serve it with good fortune.

Manaia, calling the cup of Tuiā first as the guest of honor.

Le ipu a Fasialipia.

The cup of Fasialipia.

Tuiā, taking the cup, a polished coconut shell of a pint capacity,
and pouring a libation.

Gasegase, malie lau pule. Taumafa
'ava le aitu, 'ua matagofie le fesila-
faiga lenei.

Your courtesy overwhelms me; may
your dominion endure. Let the god
quaff kava, this recognition is de-
corous.

Manaia, calling the cup of Tofaeono.

Le ipu a Ailaomaletagata.

The cup of Ailaomaletagata.

Tofaeono, clapping hands.

Fa'afetai, ia manuia.

Thanks, may good fortune endure.

Manaia, calling the cup of the speechmaker.

Lau 'ava a Manogiamanu.

Thy kava, Manogiamanu.

Manogiamanu.

Fa'afetai fa'aalo.

Thank you with great reverence.

Manaia proclaims the conclusion of the ceremony.

Le 'ava 'ua motu, 'ua mativa le fau, e
leai se mea i le tanoa.

The kava is snapped off, the fiber of
the strainer is destitute, naught re-
mains in the bowl.

Other kava may have richer form, none has less. We might cite the king's kava of Manu'a at his induction where the attendants rush forth and lay waste the town, its houses, and its fruit trees when Tui Manu'a quaffs. We might describe the royal kava of 'Upolu where the king's cup is sent back for filling ten times before it is considered full. But this less ornate ceremonial of the kava of simple gentlefolk will suffice.

All records of human society are filled with the pleasures of some cup, social life centers about the bowl. Something there is that flows and as it flows maketh glad the heart of man, and this something of liquid joy is never water. It may be the ferment product of the juice of fruits, or its more potent distillate, it may be the infusion of herbs with their content of alkaloids, it may even be the corporal extractive

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of the poisonous amanita. Many, indeed most, of these fluids which bring happiness may bring stupefaction when used to excess, moralists are ever urging moderation, in the latest stages of civic righteousness abnegation is assumed as a virtue with its correlated prohibition enforced upon the infirm of purpose.

Now what is the class into which the Polynesian kava falls? Unfortunately it has come into our knowledge through the record of earnest but stupid men who had consecrated uniformly dull lives to the amelioration of the happy pagans of the island world. They were temperamentally unable to distinguish between liquor and intoxicating liquor; because the kava bowl was the center of all social pleasure the missionaries drew the conclusion that it must be an intoxicant and therefore to be foregone. Acquaintance with the mode of preparation of the beverage is sufficient to show its quality. It is an infusion, it is of the tisane type rather than a tea, since decoction is not employed in releasing the extractives of the raw material.

The name kava, as is commonly the case in the early classes of speech, is definitely distinctive; the object is designated by a quality which to the simple mind appears specific. The plant and the beverage bear the name *kava* in Tonga, Niuē, Futuna, Uvea, Mangareva, Mangaia, the Marquesas, Nukuoro, Tikopia, Fotuna, Aneityum; *kawa* in Maori and Rarotonga; *gabai* in Uap; *ava* in Samoa; *ava* in Tahiti and the Marquesas; *awa* in Hawaii. Aside from its use as a noun to designate this plant in particular, *kava* appears in most of the languages of the Pacific as an adjective applicable to a considerable range of materials which as food or as drink may be taken into the mouth. From the various vocabularies of Polynesia we derive the following significations:

Bitter:	Maori, Tahiti, Hawaii, Marquesas, Mangareva, Rapanui.
Sour:	Samoa, Maori, Tahiti, Hawaii, Marquesas, Rarotonga.
Acid:	Mangareva, Tuamotu, Tahiti, Rapanui.
Acrid:	Samoa, Tahiti, Mangareva.
Salt:	Mangareva, Tahiti, Rapanui.
Sharp:	Hawaii, Marquesas, Rarotonga, Tuamotu, Tahiti, Rapanui.
Pungent:	Samoa, Hawaii, Rarotonga, Tahiti.
Unpleasant to taste:	Maori, Hawaii, Tuamotu, Tahiti, Rapanui.

Now it is quite clear that a descriptive adjective which applies quite as well to salt as to pepper, to vinegar and ginger and mustard alike, is not to be brought into harmony with even such loose varieties of the taste sensation as we recognize. The Polynesians do not praise the kava for its taste, it is the odor which appeals to their sense of pleasure, as we observe in Tofaeono's acknowledgment of the receipt

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of the present of the root. In fact, the taste of the infusion is slight; such woody taste as is recognized in the first sip is quite obliterated by the more distinctive effect of a numbing of the papillæ at the tip of the tongue and a lesser degree of insensibility in the mucosa of the mouth cavity as far back as the fauces, leaving the impression such as might be derived from a dusting with magnesia.

We must go back to our botany for the establishment of the place of kava. The plant was discovered by Forster and described as *Piper methysticum*, thus at the beginning of its knowledge suggesting its intoxicating quality and making it more difficult to correct that error. Miquel in a revision of the *Piperaceæ* erected upon Forster's type specimen a new genus *Macropiper*, but that has passed into the synonymy and the genus *Piper* is now accepted. This is a stout shrub freely stalking at the ground, rises to the height of six to ten feet, and when conditions are favorable shadows an area quite equal to its height. The stalks frequently attain a diameter of two inches and are heavily ringed at the nodes. The leaf is of a green so distinctive that in the Samoan the common designation of green color is *lanu-lau'ava*, "kava leaf hue". The plant occurs frequently in the jungle, but it attains its largest growth in rocky soil where it has free sunlight and it is most commonly planted between the houses in the hamlets. The part employed is the root stock, the older it is the better it is liked, and from plants which have been allowed to grow in proper conditions the root stock may attain a diameter of three to five inches along the upper two feet of its extent. Dried kava broken into convenient fragments is commonly on sale at the shops in Apia and fetches a price of a shilling a pound.

In a mistaken practice of medicine, and this was unavoidable before the discovery of the Neisserian infection, kava was suggested as early as 1857 as a succedaneum for the less tolerable resins of copaiba and cubeb. It never became official, but it still retains a place in pharmacology and it is due to that fact that we have the analysis of the root. In the United States Dispensatory kava is mentioned in a footnote in the edition of 1883, continued in the same position in 1889, in 1894 it was advanced to a capital position among the remedies "not official" and so remains. Its effect is described as the production of a local anesthesia due to paralysis of the sensory nerve filaments, it stimulates the heart and diminishes the number of pulsations by stimulating the inhibitory nerve centers, it depresses and finally paralyzes respiration. The dried root contains 23 per cent of cellulose and 49 per cent of starch. The British Pharmaceutical Codex (1907) notes the composition as an alpha-kava resin, a beta-kava resin,

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inactive crystalline substances designated kavahin (methysticin) and yangonin, and a doubtful alkaloid kavaine. We have here a group of names possessing peculiar interest since they are clever fabrications upon the common and specific names of the plant, and this holds of yangonin as much as the others, for it is created from the Fijian name of the plant *yanggona*. In German pharmacology methysticin is regarded as a narcotic and has become officinal in the treatment of asthma. The chemistry of kava and its clinical history will be found exhaustively presented at page 874 of *The Pharmacology of the Newer Materia Medica* (Detroit: Parke, Davis & Co.). To the courtesy of Prof. Frank G. Ryan, now at the head of that firm of pharmaceutical manufacturers, I am indebted for a copy of a separate of the article on kava; a copy of the work from which this has been extracted may be found in the library of the Philadelphia College of Pharmacy.

The manner in which the Samoans as well as most of the islanders who employ the beverage prepare the root for maceration has failed to commend itself to Europeans; we find it designated a "nasty cup", and as "disgustingly prepared stuff". It is familiar to all who have any acquaintance with kava that the dry root was slowly masticated by a company of young girls or of boys. The missionaries, suspecting the buccal flora which might thus become incorporated with the liquor, have effected a change, at least in part, and in every kava ceremony in which Europeans are expected to participate the root is brayed between stones. Yet the existence of the chewing custom in so many communities is evidence that it must carry some advantage. The islanders maintain that chewed kava has a better taste, and, if it were not for a wholesome fear of the micro-organisms of the mouth, I should accord with this judgment. The beverage made from brayed kava has a raw and woody taste, that prepared by chewing is lacking in the raw flavor, is apparently more potent and smoother. It is not difficult to see why this should be so. In the preceding analysis of kava root it will be noticed that the starch percentage is approximately half of the whole amount. In the mouth an abundant flow of saliva is induced and this high starch content as the result of the action of the enzyme ptyalin is largely converted into maltose which is soluble in the water of maceration. In preparing a gallon of kava recently for class demonstration I took the advice of a skilled physiological chemist and after braying the root added a supply of diastase to the infusion. No test was made to determine if the resultant sugar was the same as that produced by ptyalization, but the liquor had exactly the same taste as that produced by chewing. Reinecke (Samoa 158) writes: "Übrigens bevorzugen Kavakenner gekaute

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Kava, da sie durch die Einwirkung des Speichelferments milder wird," in which I understand his adjective to refer to the correction of what I have described as the raw flavor of unchewed kava.

We find a few instances in which pre-ptyalization is practised. In the communities of the kava custom we have observed the feeding of infants with solid food of a predominant starchy content even in the very early period of lactation and long before weaning. The nursing mothers masticate breadfruit until thoroughly moistened with saliva and feed these boluses to children while at the breast. The same food thus prepared is fed to the pet pigeons (*manutagi*, *Ptilonopus fasciatus*) and it is a common spectacle to see the Samoan mother dividing a bolus between the two dependents on her affection.

In Formosa rice is chewed and allowed to ferment in preparation of an intoxicating beverage. This, and the next items, differ from the kava of the Pacific in that the action of the salivary enzyme is followed by alcoholic fermentation.

In Andean Peru and Bolivia we find the fermented and intoxicant liquor *chicha* or *chica* prepared by ptyalization of grain. It is prepared from maize which is chewed by women until thoroughly saturated with the saliva and then set aside to undergo alcoholic fermentation.

Notes on a collection of Conebo pottery¹ gathered by Dr Farabee in his Amazons expedition establish a new locus for this drink, which formerly had been considered to pertain only to Andean culture. "The largest of all [the pots] are made primarily to hold the intoxicating drink used at the puberty ceremony for girls. At the time of this ceremony a great fiesta is held when all drink freely of *chichi*, the native intoxicating liquor made from fermented *juca* (sweet casava) and corn. The mother of the girl makes one or more of these very large pots to hold the supply of liquor for this occasion. After the ceremony they may be used for any kind of storage purposes. The largest one in the collection sent to the museum, which is the largest I ever saw, was filled with beans. Another of the jars was filled with unfermented drink. To make the *chichi* the younger women chew the root of the *juca* until saliva is thoroughly mixed with it and then spit it into a large wooden trough made from the hollowed trunk of a tree. The trough is then placed in the sun for two or three days while the mass ferments. Ripe corn is then finely ground and added with water. Fermentation continues for two days more, during which the liquor is constantly stirred. The girls strain it through closely woven baskets of palm into the large pots where it is allowed to ripen for three or

¹ *University of Pennsylvania Museum Journal*, VI, 97.

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four days. All the time the girls are working with it they expectorate into it, even after it has been strained into the large pot."

These instances have had to do with beverages. The late Mrs Matilda Coxe Stevenson¹ reports a custom of pre-ptyalization of a food of more general use than the case we have cited of Polynesian infants and pigeons. The fruit of *Yucca baccata* is chewed, set into bowls and left over night; it is then cooked and stirred without the addition of water; when cold it is made into pats and sun-dried for three days upon the roof; at the expiration of this period the pats are worked by hand into rolls a foot long and roughly three and a half inches in diameter and sun-dried for from five to ten days. These conserves are kept until needed; when used they are crumbled into water until quite dissolved. The implication is that this soup is used for food and not as a social beverage.

Peasant mothers in Bavaria have the custom of holding in their own mouths for a brief space a quantity of the thick soups common in their diet and then passing it into the mouths of their suckling children. The period of such retention need not be long, for the action of the enzyme of the saliva is almost instantaneous.

Our authorities give us a wide range of choice as to the intoxicating properties of the kava. Reinecke describes it as a harmless, refreshing drink; Turner (Samoa 113), carrying along the missionary attitude of mind toward all things enjoyable, calls it "an intoxicating draught"; even so thoughtful an observer as S. Percy Smith (Niuē Dictionary s.v.) calls it a slightly intoxicating drink. The question is of sufficient importance to call for more detailed consideration. Such a ceremony as is presented in the opening of this paper is carried out in about half an hour from the first offering of the kava to the emptying of the bowl, and of this period not so much as twenty minutes is occupied in the preparation of the drink. In case the root is brayed the infusion carries starch cells and starch granules in suspension or possibly in an emulsion, the water being normally at a temperature of 70° F. In case the root is chewed, the infusion dissolves the sugar ptyalization-product of starch. In either case the infusion is ingested so promptly that there can be no time for further fermentation. It is clear, therefore, that no alcohol has been produced and that whatever systemic effect, immediate or through habituation, is produced is due solely to the two resins and the possible alkaloid. We have indigenous authority, carried on by the missionaries, that extended inordinate use of kava produces an inflammation of

¹ Ethnobotany of the Zuñi Indians, *Thirtieth Annual Report Bureau of American Ethnology*, 72.

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the eyes and a scaly affection of the skin. The indigenous authority on medical questions is not competent and the missionary statements are worthy of little more notice. We note that these conditions appear quite as commonly among the women who use kava seldom if at all. It is further said that when a large quantity of kava is taken at one time it acts as an anaphrodisiac, produces a headache and causes incapacity of locomotion. I have never observed any of these phenomena and never have I discovered competent evidence that such is the case. On all these accounts we are justified in absolving kava from the moral obliquity of being an intoxicant. When one has acquired the taste, for it does not appear to become in any sense an addiction, kava is a most valuable refreshment after fatigue and an agreeable appetizer.

Our islanders have recognized the latter quality, for kava is always introductory to food: either it is taken before the evening meal, the principal meal of the day, or when served at other hours it is followed by at least a snack (*fono*). In Tonga we find the word *fuikava* defined by missionary authority as "food prepared to take off the effect of drunkenness," a total misconception as to the purpose but satisfactory evidence that food in some measure is expected to follow kava. From my collection of kava songs out of Samoa I cull some few references to the food which follows:

Le alofi lo 'ua mama
'a o ni ā fono o lenā 'ava?
Talā mai le fa'aotaga
ma se afi tunu o le tai masa.
Pau la ia 'o fono o le 'ava.

There is sitting of chiefs while kava is chewing,
but what is the food for that kava?
Open up the bananas buried to ripen
and bundles of cooked things of the low tide.
Let that be all of the food of the kava.

And this from the Lay of Tupai, the attendant of Tuiatua:

Ta 'ino'ino, ta te lā fia inumia
lenā 'ava lē sagā, lē fonotia.

Pshaw, I do not wish to drink
that kava undowered, with no gift of food.

Here is richer detail from yet another kava lay:

Se pagā! le ā 'o ni fono,
'a 'o le fa'asoasoa 'ua ma'e'a?
Ia o maia ni taulele'a
i 'amia ni talo mai Leva,
se fa'aotaga mai Ma'afana,
ma le 'ivi o Afamasaga
ma ni afi fā
o le Tufa'asasā,
pau la ia fono o le 'ava.

Come now! What about the food,
the serving of the kava is finished?
Come hither, ye young men,
fetch taro from Leva,
buried bananas from Ma'afana,
and Afamasaga's tidbit from the backbone,
and baked bundles of fish
of the Tufa'asasā,
let that be all the food of the kava.

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Another lay proves the necessity of the food:

'O sina meafono o ta o teua, 'o nai talo ma se ulu'au, o alu ane se na te laulaua. 'Ava e, 'o le 'a'ano a ali'i, 'a lē fonotia ta te lili.	Some food of the kava which I am keeping, some taro and its cooked leaves, let some one go and lay it out. Kava, thou meat of lords, if there be no food I shall be angry.
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In another we see a character of the food set forth:

'O ni nai meafono, 'a 'ua le 'ulu i Faleolo tolia o sau mona toto, laulau le fa'afaleolo 'atoa ma le afiololo, 'ua 'ano la ia meafono. 'O i ai na 'o mea uta 'ea, 'a e leai sina mea a tai? Tu'ia le loli!	Some food of the kava, there is breadfruit of Faleolo plucked from high branches bedewed with its gum, spread it out in choice morsels fit for lords along with baked taro pudding, this food is good. Are there only things from the shore, and nothing at all from the sea? Cut open a bêche-de-mer!
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In the last citation we find an objection even though the food is good: it is all from the land, there comes nothing from the sea, neither fish nor mollusk. It is the expression of an ignorant craving for a diversified ration, and the custom of eating the bêche-de-mer and other food raw is undoubtedly a recognition of the need of the vitamins. It characterizes the diet of the islanders, they are driven only by hunger to make a meal of a single article of food.

From the same sources in poetry we are able to discover that which in the kava best meets and satisfies the Samoan sense of enjoyment. Several of these kava songs begin with the ascription:

'Ava e, 'ava taumanu, 'ava!	Kava, sweet-smelling kava, kava!
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Of the kava in the bowl ready to serve, one bard rhapsodizes:

E malama le sua fa'atioata, e tino i lega i le u'u sama, e manogi le tino fa'alaga'ali, 'a e sasala le sua fa'afaguasi e ta'ilua tau.	The liquor glitters like a mirror, it has the substance of turmeric in scented oil, it has the fragrance of Aglaia blooms, it diffuses an odor like gourds of oil scented with sandalwood two years old.
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In the Lay of Tumele we find the pride of the kava bearer as well as the fragrance of his burden:

'Ou te lē se tagata fa'atauva'a, 'o a'u 'o le tagata o Lilomai'ava na'u sau ma nai o'u 'ava o'o 'ia Tui'a'ana,	I am no man of small account, I am Lilomai'ava's man and I have come with some of my kava to Tui'a'ana,
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'o nai mu'amu'a o le toafa,	some fresh things of the clearing
ma nai sigano o Le Toluai'ava.	and pandanus blooms of Le Toluai'ava.
Alu atu le manogi, alu atu le	The fragrance spreads, the odor spreads.
sasala.	

This bepraised fragrance of the kava has naught in common with the bouquet of a generous wine, the cup does not pause at the lip to double the enjoyment. It is the diffused odor of the kava when it is mixing in the bowl, not infrequently one sees the older men—and appetite is always a riper treasure to men of experience—scoop the air toward them from the direction of the bowl and sniff aloud their enjoyment. Yet to the man from colder lands the fragrance is scarcely perceptible unless his attention is particularly directed upon it, even then he recognizes no such pleasure as inspires these simple Samoan lays.

The source of the kava has engaged the Samoan thought, it finds its place in myth, it has become associated with some of the greater heroes of the days when men and gods interchanged communication and the joys of mutual larceny.

In my intimate acquaintance with the Samoan habit of thought, with what I hope is a warmth of sympathy, I cannot find the myth-maker conscious to himself of creating fiction. In that primitive, simple, in many respects clever, childlike frame of mind there is felt a necessity to explain the interesting common things of life. The explanation may be, in most cases is, somewhat absurd to our rationalism, but all that is required is that it shall be satisfactory to the primitive intelligence. We can picture to ourselves the primitive man thinking out origins with the feeble aid of his own undeveloped mentality. After much thought he forms in mind an explanation. Now to such a mind the most wonderful thing in life is that he thinks, the most incomprehensible. When he has created a mental image through processes of ratiocination he cannot recognize his own power of authorship, he is convinced that this which is in his mind was put there by someone external to himself, that it is a memory even though the source has escaped his recollection. He is quite as satisfied with this imperfection of recollection as our children find the "once upon a time" a satisfactory chronology. Therefore when he emits the fiction of his own intelligence he gives it currency as a tradition from some indefinite source in his own distant past; his ignorance of his own intellectuality has established for his community a myth without any consciousness of fiction or yet of novelty.

Thus we have the beginning of kava. First we shall see how

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knowledge arose of the quality which makes kava such a pleasure to an enjoyment-loving people.

Le la'au o le 'ava
na tupua'i i Suasami'ava'ava.
Na alu ane le 'imoa, gau le ata,
fono 'i le tolo, na iloa ai tagata.

The bush of the kava
sprouted in Suasami'ava'ava.
The rat passed by, chewed the stalk,
took a snack of sugar-cane, men saw it.

Here we find the discovery arising out of observation of animals. It is interesting to note that Captain Ernest Rason, R.N., has communicated to me a similar story from Yemen as offering the discovery of the value of coffee: A goatherd in the mountains observed that his flock nibbled the leaves of a certain shrub and seemed pleasantly affected; he tried it for himself, found that he had as much enjoyment as a goat, gave coffee to a waiting and appreciative world. The similarity of these myths of discovery is at least enhanced by the similarity of the names of the two great plants, Arabic *gahwe* and Polynesian *kava*, though it would be injudicious to base any linguistic speculations upon a resemblance which is but fortuitous.

In the long and intricate narrative of the history of the demigod Pili of western Samoa we find the fuller explanation of the foregoing lay. Suasami'ava'ava was the son of a king of Fiji and a Samoan wise woman. When he lay dying he bade his mother not to uproot the plants which might sprout from his grave. She saw the rat nibble one and grow dizzy, nibble the other and recover, for these were the kava and the sugar-cane. These great treasures she brought back to Samoa.

In eastern Samoa the origin of these blessings, as of most others, is ascribed to Manu'a as the first home of mankind, the first land to emerge upon earth from the chaos of waters.

Fagaina se tamaloa Tafuna
na 'aumai 'ava mai Manu'a.
Le 'ava e toia nei,
le 'ava e atia nei,
le 'ava e maia nei.

Fagaina a man of Tafuna
fetched kava from Manu'a.
The kava was planted here,
the kava was uprooted here,
the kava was chewed here.

The same thought is expressed more positively in another lay:

Se 'ava 'ea lenā maifea?
'O le 'ava lenei mai luluga,
'o le 'ava o le Tuimanu'a,
'o le 'ava nei ona muamua.

That kava, whence comes it?
This is the kava from up the wind,
the kava of Tuimanu'a,
this is the first kava of all.

In another poem an anonymous Aulus Gellius of the South Sea records the varying tales without undertaking to determine their comparative accuracy:

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Tala 'ese mai Tutuila
'ua tala i le fa'aananafi na
ni 'ava na toto i Niniva,
na fa'aifo i le lagi tuaiva.

'Ua le tala i le fa'aanamua
ni 'ava na toto i Lalopua,
na fa'aifo i le lagi tualua.

From Tutuila comes a variant tale
told in the yestere'en
that kava was planted in the Giddy Place,
that it was brought down from the ninth
heaven.

A tale there is of ancient days
kava was planted in Lalopua,
that it was brought down from the second
heaven.

It is no unusual picture of primitive man to regard humankind as living in destitution until it is able to wrest from the gods the things which make life sweet. The foregoing lay points in this direction and is told in greater detail in the myth of Lefanoga, the hero, who fought the gods in the heavens and brought down kava to make glad the hearts of men, though in the prose versions at present accessible it is the eighth heaven in which he won his victory.

Yet one more lay of origin, here we return to the Fijian credit, yet it becomes associated with the gods:

'O 'ava 'ula na solo mai Fiti
i le atunu'u o sauali'i.

This ruddy kava cometh from Fiji
and the islands of the gods.

These notes may fitly be rounded out with a brief vocabulary of the various terms which are used in connection with the Samoan kava.

ata	the stem of the kava plant.
'ātā	a branch or twig of kava, particularly pieces cut for setting.
ati	to pull up kava.
fa'asoasoa	to serve the beverage in order of rank.
folafola	to proclaim the kava ceremonial.
fono	the food which follows the service of kava.
fui'ava	to mix water with the comminuted root.
le'a	the strongest kava, reserved for the highest chiefs.
lele'a	fermented, said of kava that has stood too long.
lili'ava	to prepare kava for drinking.
logopapa	descriptive of kava planted in rocky soil and therefore stout in texture.
loma	to watch to see to whom the first cup shall be served.
māga	a mouthful of kava chewed and ready for mixing with water.
pipifai'ava	kava root from which the cortex has been scraped in making ready for chewing.
solo'ava	songs of kava drinking.
sua'ava	green in hue, a synonym of lanulau'ava.
sui	to mix the comminuted kava with water.
sula	a song of thanks for a present of kava.
tane	the kava stain in bowl and cup.
tanea	to be stained with kava
tanetanea	to be full grown, said of the kava plant.
tanoa	the kava bowl.

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tapa	to call the cup of kava for a chief by its ceremonial designation.
tapafua	to call the cup of kava for a chief by his personal name.
tāpati	to clap the hands when about to serve out the beverage.
tau'ava	to strain the kava with a swab of hibiscus fiber, to wring the swab in order to fill the cup.
tautū	to serve the kava in ceremonial order.
tō	the kava swab of hibiscus fiber.
tunasi	branches of the kava root.
ui	to strain the kava.
usi	to strain the kava.
uso	the root stock of kava.
usu	to be clear, said of kava well strained.
vaiata	the root branch of kava which does not sprout.
vaitina	a part of the kava root stock.

The intent of this paper has not at all been to present an exhaustive monograph upon the kava of the South Seas, but within the restriction stated in its title to present a summary conspectus of the Samoan usage. Indeed, except for the necessity of writing certain pharmacological details into the record as explicative of Samoan custom, a not inconsiderable mass of unpublished material has been drawn upon for the purpose of persuading the Samoans themselves to tell their own story. It has been advisable to make certain brief comments in order to make the Samoan record more comprehensible, but in general and in most of the particulars the statements here presented have been derived directly from old and sage Samoans whose minds are a storehouse of the knowledge of the past of their race.

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Music in its Relation to the Religious Thought of the Teton Sioux

By FRANCES DENSMORE



INDIAN music is essentially vocal, though the pounding drum and resounding rattle force themselves so insistently on the ear of the listener. No degrees of tone are produced by these instruments. Quality of tone is the only element sought in their manufacture, and their only purpose is to punctuate the rhythm of the song or to quicken the movements of the dancers. The only instruments made by the American Indians that produce degrees of tone are the flageolet and the long whistle. The former, known as the "courting flute", has usually seven finger-holes and produces a wide range of tones, while the whistle has no finger-holes and gives a part of the series of tones procurable from an open pipe, the number of such tones depending on the length of the whistle. These instruments, however, are not used with sufficient frequency to form a basis for the music of the race. It is said that many primitive peoples base their music on the fixed tones of their musical instruments, the vocal music being, in a sense, an imitation of the instrumental. But the foregoing facts show that this can scarcely be a correct observation concerning the music of the American Indians; indeed, in studying the oldest available Indian music it seems probable that we are observing a psychological and physiological manifestation which is not influenced to a marked degree by any artificial standards.

In considering the subject of this paper we will first note the traditional origin of song among the tribes studied by the writer, namely, the Chippewa, Sioux, Mandan, Hidatsa, and northern Ute. The statement current in these tribes is that, in the old days, all the songs were "received in dreams". It is clearly indicated that no musical instrument, either of percussion or of the flute type, was used to hasten the coming of the song to the mind of the dreamer. Song was regarded as a vocal expression which was supernaturally inspired, not only in the fact of its being but also in the form which it assumed.

"Religious thought" in this connection will be considered chiefly in its personal sense. It may perhaps be said that organized religion begins with the formulation of a system of beliefs, taught by an

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established priesthood, either hereditary or otherwise, and that ritual usually forms a part of this system. Evidences of such institutions have been found, to some extent, among the Mandan. Aged members of that tribe related to the writer numerous ceremonial customs, among which was the "cleansing of the corn" by the "corn priest". This was done in the spring of the year in order that there might be an abundant harvest. Songs of the corn priest, as well as other ceremonial songs by those who had the hereditary right to sing them, were phonographically recorded. Extended rituals, with their songs, have been obtained among various tribes by ethnologists, but the scope of the present paper will be limited to data recorded by the writer among the Teton Sioux on the Standing Rock reservation in North Dakota and South Dakota.

The only religious gathering of the Teton Sioux was the annual Sun dance. The ceremony of the Sun dance was marked by definiteness and formality, but available information does not indicate the survival of a ritual. A leader of the ceremony was elected every year. The requirements for this office were exacting and the men who filled it were treated with great respect. Songs were sung by the leader during certain portions of the ceremony, and there were acts which were performed only by him; but his office appears to have terminated with the ending of the ceremony. Thereafter he was referred to, not as a "priest", but as "one who had been leader in the Sun dance." The chief requisite of the man elected to this office was that he had had a dream, usually a dream of the sun. Thus Red Bird (one of the writer's informants) said that he fell unconscious during a Sun dance, and saw a man's face in the sun. The face was painted. It was said that this vision was sufficient to entitle him to act as leader in the Sun dance after he had received the proper instructions concerning the duties of that office.

Early missionaries among the Sioux have stated that they were polytheists. Perhaps in this, as in many religious distinctions among white people, the principal difficulty lies in the effort to express in words that which is too large to be defined in this manner. The old men among the Teton Sioux say that their people have always believed in *Wakan'tanka*. When questioned as to their understanding of the word, an old man, known as a "heathen Indian", said to the writer: "It is hard to explain what we believe about this. It is the general belief of the Indians that after a man dies his spirit is somewhere on the earth or in the sky; we do not know exactly where, but we believe that his spirit still lives. . . . So it is with *Wakan'tanka*. We believe that he is everywhere, yet he is to us as the spirits of our

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friends whose voices we cannot hear." Another informant said: "This earth is under the protection of something which at times becomes visible to the eye; . . . its representations appear everywhere; . . . they are the sacred stones [*tuykan*']." In dreams men saw these mysterious stones, or they saw the thunderbirds, or some other manifestation of the supernatural, but around Wakan'tanka there was such awe and such reverence that it is said the very name was seldom spoken in the old days. Silence enshrouded that which represented the deepest religious thought of the Sioux.

Let us now turn our attention to the "dream" or "vision", which seems common to all tribes of Indians. The seeking of a dream may be considered the simplest religious thought of the Sioux. In it there was a desire for communication with the supernatural and for help in personal undertakings. Around this, as around the name of Wakan'tanka, there was a veil of silence. In his simplest as well as in his deepest religious thought the Sioux "entered into the silence." This silence was more than an absence of sound—it was a positive element. The white race knows little of this marvelous quiet of the soul, but the Indian knew its possibilities. He voluntarily sought it, and waited for its fruition. He could wait in intensity of feeling until the silence became vibrant and a song sprang from it, like lightning from a cloud. This intensity is indicated by the high pitch on which a majority of Indian songs begin, the pitch of the song descending as though expression reduced the tension of mind. After descending to a low tone the song usually returns to a high pitch, continuing in an ebb and flow of melody. No drum or rattle went out with the dreamer. The rhythm and the melody of his song were not influenced by material means. He believed that his song came to him from the supernatural, and for that reason he believed the song had a mysterious power. With confidence he used these songs in the treatment of the sick, or when hard pressed in time of danger he sang them, believing the visitants of his dream would return in response to his singing. The Indian cannot, if he would, describe with exactness a belief so mystic, and, in large measure, our knowledge comes from narratives to which the use of the "dream song" is incidental. The only requisite in the use of such a song appears to have been that the song must belong absolutely to the man—it must be his individual song, either received by him in a supposedly supernatural manner or, in some instances, purchased by him at great price from a man who so received it. The song of power was the song that came out of silence—a silence fraught with awe, perhaps with fear; underlying it there was an element of what we call "religion".

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The isolation of the Indian "dreamer" finds, to some extent, a counterpart in the isolation sought by our own poets and musicians, but the attitude toward it is different. They seek freedom from interruption in order that *they* may compose. They do not say that under such conditions the supernatural works through them, nor do they consider composition to be a religious act. We are losing our sense of the supernatural. Its emphasis is passing out of our religion and in its place there has come a new emphasis on our duty to society. We are losing our thought of the throng of ministering spirits, and in its place we are taught, as part of our religion, our duty to the crowded human beings around us. Necessary as this may be to the life of the twentieth century, there is passing, in the change, that realization of the value of solitude and silent meditation which are the basis of the religious thought of the Indian.

Three phases or manifestations of religious thought among the Sioux will be presented. While they appear to be successive it should be understood that they are mentioned in this order for convenience of discussion, not as an arbitrary arrangement.

(1) The desire for a dream and its song. This was solely for personal benefit, the man desiring help in his individual undertakings. A peculiar view of this "dream-seeking" was presented to the writer by the Reverend John Eastman, who said, "The old Indians believed that before they were born they knew something, and when they tried to get a dream they were trying to recall what it was that they knew then, and to get a song from it." This suggestion is filled with interesting possibilities, especially as so many of the dreams concerned animals, but no investigation has been made by the writer along this line of thought.

(2) The use of a song, the words of which expressed a request for a benefit to someone other than the singer. Red Weasel, an aged Sioux, said he was instructed that "Wakan'tanka heard requests sooner if they were sung than if they were spoken." This division might include prayers for the recovery of a relative who was ill, or for the safe return of a war-party of which one was a member. A vow was frequently made with an individual request of this kind.

(3) The use of prayer, whether expressed in song or otherwise, in which request was made for the welfare of the tribe as a whole, it being understood that the person expressing the prayer did so in behalf of the assembled people. Instances occur in the Sun dance, in which the leader offered prayers and the people were "expected to join with him in their hearts."

Having noted these three phases, we shall concern ourselves with



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illustrating only the first, which seems to lie nearest to the beginning of the entire series of phenomena. Eleven dreams were related to the writer and their songs recorded by men who regarded them as sacred things, portions of an experience which they seldom mentioned, so reverently was it regarded.

It was said that "all men could not have the same kind of a dream. Thus the dream of a young man would be different from that of a chief." This suggested a correspondence between the character of the man and the nature of his dream. It is true that the dream probably influenced the development of the character of the man if it came to him in his youth, yet the following observations indicate that such a correspondence actually existed to some extent.

Three dreams will be presented, with their songs, the dreamers being Šiya'ka (commonly known by his Sioux name, the English equivalent of which is "Teal Duck"), Charging Thunder (whose Sioux name means literally "Charger of the Thunderbirds"), and Brave Buffalo (whose Sioux name means "Furious Buffalo Bull"). These men may be characterized as follows:

Šiya'ka, who dreamed of the crow, owl, and elk, was a gentle, genial nature, ready with a jest among his companions, respected by them all, but not an aggressive leader. Charging Thunder, who dreamed of the thunderbirds, is a man with whom to will a thing is to accomplish it, if it be humanly possible. Brave Buffalo, who dreamed of the buffalo and the wolf, as well as of the mysterious sacred stones, is a man of absolute independence who was engaged in the practice of native medicine at the time of his conferences with the writer.

It is difficult for a member of the white race to realize what it means to an Indian to tell his personal dream. A sanctity surrounds these experiences which seems to justify the use of the term "religion", the word being used in the sense of "that which is holy or sacred." Šiya'ka was deeply affected by the narration of his dream. Some men fear that such an act will cause their death, but Šiya'ka did not speak of this. He took the writer's hand, saying that he had given her his most cherished possession. In a little more than a year Šiya'ka was laid to rest in the prairie he loved.

Narrating his dream Šiya'ka (pl. 1) said:

When I was a young man I wanted a dream through which I could know what to depend upon for help. Having this desire, I went to a medicine-man and told him about it. He instructed me what to do, and I followed his instructions in everything. He told me to get four well-tanned robes, with one for my own use, also a decorated pipe and offerings of tobacco, and to appear before him on a

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certain day prepared to seek my vision. I prepared the articles as he directed and went to him on that day. He painted my face white, and before leaving him we went together into the sweat lodge, and while we were there he told me of his own dream and gave me an idea of what a dream was like. I had already selected a hill on which to await my dream, and after leaving him I went to this hilltop to follow his instructions. I was not required to fast before seeking the vision, but of course took no food with me when I went to the hilltop. In the middle of this hilltop I dug a hollow about two feet deep and large enough so that I could crouch against its side when weary with standing. At each of the four points of the compass I placed one of the robes and some of the tobacco. These offerings were to show that I desired messages from the directions of the four winds and was waiting anxiously to hear the voice of some bird or animal speaking to me in a dream.

Having placed these offerings in position, and according to the advice of the medicine-man, I stood facing the west and watched the sun disappear. As soon as the sun was out of sight I closed my eyes and turned my face toward the east, standing thus for awhile, then faced the north and the south. So I stood, wrapped in a buffalo robe. I was not exactly singing, but more nearly lamenting, like a child asking for something. In the crying or lamenting of a young man seeking a vision two things are especially desired: First, that he may have long life, and second, that he may succeed in taking horses from the enemy.

Beside me, at the north, was placed a buffalo skull, the face of which was painted with blue stripes. The openings of the skull were filled with fresh sage, and it was laid on a bed of sage. The skull was placed with its face toward the south. The reason for this was that when the buffalo come from the north, traveling toward the south, they bring news that Wakan'tanka has provided food for the Indians and there will not be a famine. During part of the time I rested my pipe against the buffalo skull, with the stem pointing toward the north. Part of the time I held the pipe in my hands, with the stem away from me. The pipe was filled, but not to be lighted until I returned to the medicine-man after my dream.

As I still faced the west, after the sun had set and when it was almost dark, I heard a sound like the flying of a bird around my head, and I heard a voice saying, "Young man, you are recognized by Wakan'tanka." This was all the voice said.

All night I stood with my eyes closed. Just before daybreak I saw a bright light coming toward me from the east. It was a man. His head was tied up, and he held a tomahawk in his hand. He said, "Follow me," and in an instant he changed into a crow. In my dream I followed the crow to a village. He entered the largest tent. When he entered the tent he changed to a man again. Opposite the entrance sat a young man, painted red, who welcomed me. When I was thus received I felt highly honored, for as this was the largest tent I knew it must be the tent of the chief. The young man said he was pleased to see me there. He said, further, that all the animals and birds were his friends, and that he wished me to follow the way he had used to secure their friendship. He told me to lift my head. I did this and saw dragon flies, butterflies, and all kinds of small insects, while above them flew all kinds of birds. As soon as I cast down my eyes again and looked at the young man and at the man who had brought me thither, I saw that the young man had become transformed into an owl, and that my escort had changed again into a crow. The following is the song of this part of my dream:

DENSMORE—TETON SIOUX MUSIC

SONG OF THE CROW AND THE OWL

VOICE ♩ = 69

SUNG BY ŠIYA'KA

DRUM not recorded

Haŋ - ye - tu ma - wa - ni haŋ - ye - tu ma - wa - ni nuŋ -

we e o haŋ - ye - tu ma - wa - ni ta - to he - ya

ma - wa - ni nuŋ - we haŋ - ye - tu ma - wa - wa - ni hiŋ -

haŋ wa ho - toŋ - haŋ ma - wa - ni nuŋ - we he o

WORDS

(First rendition)

haŋye'tu	at night
mawa'ni nuŋwe'	may I roam
tato' heya'	against the winds
mawa'ni nuŋwe'	may I roam
haŋye'tu	at night
mawa'ni	(may) I roam
hiŋhaŋ'	(when) the owl
ho'toŋhaŋ	(is) hooting
mawa'ni nuŋwe'	may I roam

(Second rendition)

aŋ'paö	at dawn
mawa'ni nuŋwe'	may I roam
tato' heya'	against the winds
mawa'ni nuŋwe'	may I roam
aŋ'paö	at dawn
mawa'ni nuŋwe'	may I roam
kaŋgi'	(when) the crow
ho'toŋyaŋ	(is) calling
mawa'ni nuŋwe'	may I roam

¹ This bracket is used by the writer to indicate a "rhythmic unit".

HOLMES ANNIVERSARY VOLUME

Continuing his narrative, Šiya'ka said:

The owl said, "Always look toward the west when you make a petition, and you will have a long life." After this the owl commanded me to look at him; as soon as I did this he was changed to an elk, and at his feet were the elk medicine and a hoop. As soon as I saw him changing, I began to wonder what marvel would be next. Then I heard a song. I tried to learn the song, and before I realized what I was doing I was singing the song.

The following is the song taught me by the elk in my dream.

WHERE THE WIND IS BLOWING

VOICE ♩ = 54

SUNG BY ŠIYA'KA

DRUM not recorded

He To - ki ta - te u - ye ċiŋ ta - te i - ċa -

ĥmuŋ-yaŋ na - wa - žiŋ ye o wi - yo-hpe-ya - ta ta-te u - ye

ċiŋ ta - te i - ċa-ĥmuŋ-yaŋ na-wa - žiŋ ta - te to - ki u - ye

ċiŋ ta - te i - ċa - ĥmuŋ-yaŋ na - wa - žiŋ ye o

WORDS

to'ki
tate'
uye' ċiŋ
tate'
i'ca'ĥmuŋyaŋ
nawa'žiŋ ye
wiyo'hpeyata
tate'
uye' ċiŋ
tate'
i'ca'ĥmuŋyaŋ
nawa'žiŋ ye

where
the wind
is blowing
the wind
is roaring
I stand
westward
the wind
is blowing
the wind
is roaring
I stand



CHARGING THUNDER

DENSMORE—TETON SIOUX MUSIC

After this dream my stronghold was in the east, but the west was also a source from which I could get help. All the birds and insects which I had seen in my dream were things on which I knew I should keep my mind and learn their ways. When the season returns, the birds and insects return with the same colorings as the previous year. They are not all on the earth, but are *above* it. My mind must be the same. The elk is brave, always helping the women, and in that way the elk has saved a large proportion of his tribe. In this I should follow the elk, remembering that the elk, the birds, and the insects are my helpers. I never killed an elk nor ate its flesh. The birds that continually fly in the air I would not kill. I may kill water birds and grass birds if suited for food, but only these.

Among the Teton Sioux a dream of the thunderbirds was considered the greatest honor which could come to a man from the supernatural. The manner in which the thunderbirds were regarded is indicated by the following statement by an old and particularly thoughtful member of the tribe, named Shooter, who said:

Dreamers have told us of these great birds in the sky, enwrapped in the clouds. If the bear and other vicious beasts are regarded as dangerous, how much more should we fear the thunderbirds that cause destruction on the face of the earth. It is said that the thunderbirds once came to the earth in the form of giants. These giants did wonderful things, such as digging the ditches where the rivers run. At last they died of old age, and their spirits went again to the clouds and resumed their form as thunderbirds. While they were on earth the rain fell without sound of thunder or flash of lightning, but after their return to the sky the lightning came—it is the flash of their eyes, and the thunder is the sound of their terrible song. When they are angry the lightning strikes a rock or tree as a warning to men. The bodies of these giants became stone, and parts of them are found in many places; indeed the whole body of more than one of these giants has been found in the land of the Dakotas.

Two dreams of the thunderbirds were related to the writer by men who dreamed them, and in both instances the thunderbirds assumed the form of men riding on horses. A dream from which a man received his name is considered of special importance. The following dream of the thunderbirds, by Charging Thunder, is such a dream.

In narrating his dream of the thunderbird, Charging Thunder (pl. II) said:

Soon after the Standing Rock Agency was established I asked the agent (an Army officer) if I might go hunting. I said that before I settled down and adopted the ways of the white man I would like to go hunting for an indefinite length of time. Permission was granted, and I went out alone. As I was going north, near Timber lake, I saw a deer coming toward me from the north. I wanted to shoot the animal, but thought I would wait until it came nearer. The deer must have come very slowly, for while I was waiting I fell asleep and dreamed. In this dream I saw the deer still coming toward me, and behind it were several men riding on painted horses with grass tied on their forelocks. The riders seemed to be pursuing some object. I became one of these riders, and they told me to lead

HOLMES ANNIVERSARY VOLUME

the party. Then they told me to make a charge on the object which they were pursuing. At first I was not sure what this was, but I soon saw it was a wolf standing toward the west with its face toward the north. I was chosen to do this, because some day I would need the protection of these riders, who were thunderbirds who had assumed human form. They told me that because I had been chosen to make that charge and had become one of their number I would ever thereafter be called Wakin'yan Wata'kpe (Charger of the Thunderbird). After I had attacked and defeated the wolf I saw beyond it a camp with many horses and a man lying dead on the ground. This signified that some day I would conquer an enemy and capture his horses. Ever since that time my greatest enemy has always seemed to me like a wolf, and whenever there is a thunderstorm I am reminded of my dream.

THE THUNDERBIRD NATION SUNG BY CHARGING THUNDER

VOICE ♩ = 76

DRUM not recorded

Le-na-ke wa - ku - wa-pi kte le-na-ke wa - ku -

wa-pi kte-lo he o wa - kin - yan o - ya - te pi ca yo

yo si - to - mni wa - ku - wa-pi kte si - to-mni - yan

wan - la - ka - pi kte si - to-mni - yan wa-ku - wa-pi kte-lo he

WORDS

lena'ke
waku'wapi kte
lena'ke
waku'wapi ktelo'
Wakin'yan oya'te pi ca
sito'mni
waku'wapi kte
sito'mniyan'

all these
shall pursue
all these
shall pursue
the Thunderbird Nation
everyone
shall pursue
everyone



BRAVE BUFFALO

DENSMORE—TETON SIOUX MUSIC

wana'kapi kte
sito'mniyan
waku'wapi ktelo'

you shall behold
everyone
shall pursue

To dream of a small stone was regarded by the Teton Sioux as a sign of great import, indicating that the dreamer, by fulfilling the requirements of his dream, would become possessed of supernatural power, in the exercise of which he would use the sacred stones. This power would be shown in an ability to cure sickness, to predict future events, and to tell the location of objects that were beyond the range of his natural vision. The stones were the native brown sandstone, and usually spherical in form, though stones oval and stones slightly flattened were also used, the principal requirements being that they should be regular in outline and untouched by a tool. The symbolism of the stones was given by a Teton Sioux as follows:

The outline of the stone is round, having no end and no beginning; like the power of the stone, it is endless. The stone is perfect of its kind and is the work of nature, no artificial means being used in shaping it. Outwardly it is not beautiful, but its structure is solid, like a solid house in which one may safely dwell. It is not composed of many substances, but is of one substance, which is genuine and not an imitation of anything else.

The man whose use of the sacred stones is most open at the present time is Brave Buffalo (pl. III), a prominent medicine-man of the Standing Rock reservation, about 73 years of age. In describing his dream of the sacred stone Brave Buffalo said:

When I was ten years of age I looked at the land and the rivers, the sky above, and the animals around me, and could not fail to realize that they were made by some great power. I was so anxious to understand this power that I questioned the trees and the bushes. It seemed as though the flowers were staring at me, and I wanted to ask them "Who made you?" I looked at the moss-covered stones; some of them seemed to have the features of a man, but they could not answer me. Then I had a dream, and in my dream one of these small round stones appeared to me and told me that the maker of all was Wakan'tanka, and that in order to honor him I must honor his works in nature. The stone said that by my search I had shown myself worthy of supernatural help. It said that if I were curing a sick person I might ask its assistance, and that all the forces of nature would help me work a cure.

Continuing his narrative, he said:

Some people have an idea that we medicine-men, who get our power from different sources, are the worst of human beings; they even say that we get our power from the evil one, but no one could disregard such dreams as I have had, and no one could fail to admire the sacred stones. Wakan'tanka is all-powerful, and if we reverence his work he will surely let us prove to all men that these things

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are indeed his doing. It is a very strict requirement that a medicine-man shall act out his dream, and that he maintain absolute integrity of character. If he fails to do this he will be punished and will not live long. I am not required to fast, only to smoke, showing that I am at peace with all men. Dreams come to me now in a natural way. Often during the day when I am alone on a journey and my mind is on many things, I stop to rest a while. I observe what is around me, and then I become drowsy, and dream. Often I see the sacred stones in my dreams.

Brave Buffalo did not record a song of his dream of the sacred stones, but among the songs recorded by him is a song belonging to Crow Bear, his father, who was a famous singer and medicine-man. Brave Buffalo said his father was required by one of his dreams to sing this song every morning, and that he never failed to do so. The song was used in the treatment of the sick, during which it was customary to use the drum, as indicated.

BEHOLD THE DAWN SUNG BY BRAVE BUFFALO

VOICE ♪ = 138

DRUM ♪ = 138

Drum-beats in quarter notes.

An - pa -

o wan hi - na - pe - lo wan - yan - ka yo

DENSMORE—TETON SIOUX MUSIC

WORDS

an'paö wan	a dawn
hina'pelo	appears
wanyan'ka yo	behold it

These illustrate only a small portion of the dreams of the Teton Sioux, to which should be added the dreams of the many tribes of Indians which once called our country their own. In these dreams and their songs we trace a desire for communication with the supernatural which may be considered the beginning of religious thought. With the passing of the Indian there will vanish from the earth a race to which every phase of human life had a religious aspect and to which all nature was the manifestation of deity. And with the Indian will forever pass away the song which came from the supernatural, the song on which, as on a rainbow bridge, mysterious spirits came to man that they might share with him the tremendous power of the unseen universe.

BUREAU OF AMERICAN ETHNOLOGY
WASHINGTON, D.C.

The Swan-Maiden Theme in the Oceanic Area

By ROLAND B. DIXON



NE of the best known and most widespread themes in Indo-European mythology is that of the Swan-maiden, or Bird-woman. Minor details and variations aside, the essential features of the story are as follows:

Certain sky-maidens are accustomed to fly down to earth in the form of birds, for the purpose of bathing; on reaching their bathing-place they lay aside their winged garments; a youth observes them from a hiding-place, and steals the garments of one of the maidens; she is thus unable to fly back with the others to the sky-land, and becomes the wife of her captor; later she discovers her wings which her husband had hidden, and putting them on, flies back to the sky.

In one form or another the tale has a wide distribution in Europe; it occurs both in modern India and in the ancient literature, as well as in Persia. Outside the Indo-European field it is known from Siberia, Tibet, Burma, Annam, in the Thousand and One Nights, and in Madagascar, and is of wide distribution in Indonesia and the islands of the Pacific. Examples have also been reported from America.¹ In the present paper I propose to discuss the occurrence of the tale in one portion of this large field, i.e. Indonesia and the islands to the eastward.

The great island of Sumatra, which so nearly touches the Asiatic mainland at the Straits of Malacca, is occupied today by peoples who may be roughly divided into two groups, (a) the great bulk of the Malay population which has been for several centuries more or less completely converted to Islam, and (b) the non-Mohammedan population, comprising the Battaks, Achinese, and the still more primitive Kubu, and other aboriginal tribes. The Kubu and similar wild tribes may be left out of our consideration, owing to the absence of any mythological material from them. The Achinese, who occupy the northern tip of the island, have received considerable attention, and from them myth material is known. The Swan-maiden story appears

¹ For numerous references to this tale, see Cosquin, *Contes populaires de Lorraine*, vol. II, pp. 16 sq.

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in their literature in the Hikayat of Malim Dima.¹ This hero, in the form of a fish, was swimming about in the waters whither Putroë Bungan and her sisters had come down to bathe. By stealing her winged dress, he prevented her from flying back to her father's aerial kingdom, and so secured her as a wife. One day, during Malim Dima's absence, the child which had been born to him, discovered his mother's bird garment, which had been carefully hidden away. Her power of flight being now renewed, Putroë Bungan flew back to the sky-land, taking her child with her. Her husband was inconsolable, and determined to seek her. After a number of episodes which are unimportant in connection with the tale under consideration, he ascended to the upper world on a "buraq"² and rejoined his wife and child. From the Battak two versions are given.³ In the first, the hero bears the same name as in the tale just given. The chief differences, apart from a greater elaboration, are that the cause of the wife's departure was the unkindness of her mother-in-law; that Malin Deman reached the sky-land by the way of a mountain whose summit touched the clouds; and that after discovering his wife in the upper world, he returns with her and the child to earth. The second Battak version is told of another hero, the details being almost identical, however.

From the Menangkabau Malay no full version of the tale is available to me, but the whole story is said to be well known among them⁴ and attributed to a hero bearing the same name as in the Achinese and Battak versions. The tale also occurs among the people of the Mentawai islands.⁵ The close agreement of the various Sumatran stories, extending even to the name of the hero, argues their common origin, and indeed some are declared to be directly derived from the Malay forms. As the story is stated⁶ to date among them from the period prior to their conversion to Islam, it would seem that we must seek its origin, or at least the development of its present form, in a relatively early period.

In Java the Swan-maiden story is widely known, occurring both among the present population⁷ and in the older literature⁸ of pre-Islamic times. The Javanese versions are distinguished at the outset, from those just considered, by the name Widadari given to the bird-maidens. This is clearly only a modification of the Sanskrit term Vid-

¹ Hurgronje, *The Achinese*, vol. II, pp. 125 sq.

² The mythical winged beast on which Mohammed was carried to heaven.

³ Pleyte, *Bataksche Vertellingen*, pp. 117 sq., 223 sq.

⁴ Pleyte, *op. cit.*, p. 291, note 26.

⁵ Morris, *Mentawai Sprache*, p. 56.

⁶ Pleyte, *loc. cit.*

⁷ Bezemer, *Volksdichtung aus Indonesien*, pp. 46 sq.

⁸ van Herwerden, *Verh. Bat. Gen. v. K. en W.*, vol. XX, pp. 91 sq.

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hyadara, by which these sky-maidens are known sometimes in early Indian literature. An added element, not occurring in the Sumatran forms, is the magic power of providing food which the captured maiden possesses. The Javanese tale, on the other hand, lacks both the carrying off of the child and the husband's quest. As is well known, Indian influence in Java had already become strong perhaps as early as the beginning of the Christian era, and later, Hinduized kingdoms such as that of Modjopahit dominated the larger part of the island. At first Buddhist and later Brahmanistic religious ideas held sway, to which the sites of Boroboedoe and Prambanan, etc., bear witness today. From this long contact with Indian culture and the fact that the name used for the sky-maidens is the same as that often used in Indian literature, we may be confident that the tale as it now occurs is either wholly of Indian origin or greatly metamorphosed by contact with Indian culture.

From Borneo the available material is rather limited, especially as regards the interior tribes, such as the Kayan, whose possible relations with the Javanese Hindu culture are becoming better established. One version, however, is given from the Sarawak coast.¹ In this form of the story, which is told to account for the origin of an interior tribe, a man who had taken refuge for the night in a tree in the jungle, heard ravishing music, and, looking down, beheld seven maidens bathing in a pool. The man desired one of the girls as a wife for his son, so he let down a noose, and drew one of them up into the tree. The others all flew away and the captive was taken home and became the wife of the old man's son. She told her husband not to make her cry, for if he did, she would leave him. One day he was in a rage, and beat her, pulling off her jacket to strike her. She wept, and immediately another jacket dropped from the sky with a noise like thunder. She put this garment on and vanished upward, leaving her child, who became the ancestor of the tribe. It is obvious that we have here a garbled version of the story.

Among the Toradja² in central Celebes the theme forms part of a long tale. Magoenggoelata, angered by the wind blowing away some of his rice, determined to seek the place whence the wind came, and stop up the hole through which it blew. In the course of his quest, after other adventures, he descends to the underworld, the home of the ghosts. While there he saw seven parroquets, which flew down daily to bathe. He hid and watched them, and saw that they laid aside their bird garments and became beautiful maidens. Hiding the

¹ McDougal, H., *Sketches of our Life at Sarawak*, pp. 87 sq.

² Adriani, *Bijdr. Taal-, Land- en Volkenkunde Ned.-Indië*, vol. LII, pp. 296 sq.

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dress of the youngest and most beautiful, he made her captive and took her as his wife. Her garment was returned to her, when she promised not to fly away. For a time she was happy in her new home, but soon felt a longing to revisit the sky-land. Her husband agreed to let her go, if she would promise to bring him back a winged garment for his use. She did so, and when he had put it on, he flew back with her to the sky, to visit her family. From the Minahassa¹ in the north of the island comes a version which preserves only a portion of the original story. Mamaaaua, while hunting one day in the jungle, hears his dogs barking and finds that they had surrounded a beautiful naked woman. She tells him she has come down from the sky country and finally agrees to become his wife. She warns him, however, that if ever a hair of her head is pulled out, she will have to leave him. After some time, he forgot the warning, and in lousing her head he accidentally pulled out a hair. At once blood gushed out, a cloud settled over the house, and his wife disappeared. Disconsolate over her loss, he took the child and set out to seek his wife. Various birds one after another try to carry him to the upper world in vain, but he finally succeeds in reaching the sky, by ascending with the sun. Arrived in the upper world, he finds his wife, and identifies her by the aid of a fly which settles upon her head, and thus marks her out from her sisters. He remains with his wife, then in the sky, but the child is sent down to earth once more.

From the Sangir islands extending north from Minahassa nearly to Mindanao in the Philippines there is a version² which again shows unmistakably its Indian source. Here the sky-maidens are again called Widadaris, and the ascent of the husband to the sky-world is by means of a ladder which is let down for him from the sky. Several of the details, as might be expected, agree with the Minahassa form, e.g. that the wings are given back voluntarily to the sky-maiden. The ascent of the husband follows immediately without the interval characteristic of most of the other versions. From its similarity to some Javanese forms of the story,³ it seems likely that it was introduced from there.

Equally clearly of Indian origin is the form of the tale current in Halmahera among the Loda.⁴ The sky-maidens are once more known as Widadaris, and the captor is at once taken by his heavenly wife to the upper world in a flying palace. A form of the story obtained at

¹ Wilken, *Med. Ned. Zend. Gen.*, vol. VII, pp. 326 sq.

² Adriani, *Bijd. Taal-, Land- en Volkenkunde Ned.-Indië*, vol. XLIV, pp. 98 sq.

³ Babad Tanah Djawi, 1874, p. 41.

⁴ van Baarda, *Bijd. Taal-, Land- en Volkenkunde Ned.-Indië*, vol. LVI, pp. 466 sq. Cf. the version from Ternate given by Riedel, *Tijd. Ned. Indië*, 3d ser., vol. V, pp. 439 sq.

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Nufoor in Geelvink bay (New Guinea) presents again some features more nearly like those farther west. The Javanese incident of the wife's being able to produce food magically reappears, together with the concealment of the wings, and their discovery by accident. The story is told to account for the origin of the families of the sultans of Tidore, Djatak, Batjan, and Ternate, and is evidently thus a modern adaptation of the material.

If we turn now northward, the essential elements of the tale may be followed to the Philippines. Among the Visayans¹ of Panay the tale appears in practically the same form as in Sumatra, the main differences being that after the sky-wife has discovered her hidden wings and flown away, the husband ascends on an eagle, and does not secure her again until he has performed a number of tasks set by her grandmother, in the accomplishment of which he is aided in familiar fashion by a series of animals. Among the tribes of northern Luzon the story has been recorded among the Igorot² and the Tinguian.³ In both forms the sky-maidens are said to be stars who come down to eat sugar-cane. The Igorot tale relates that the wife sewed wings upon herself and children and flew back; the Tinguian form shows a suspicion of Indian influence in the chair or ladder let down from the sky, by which both man and wife ascend.

Before proceeding to consider other fields of distribution of the tale, it will be well to summarize briefly the results already attained. The survey of the Indonesian area has established the fact that the story is known from one extreme of the region to the other. In the Javanese forms, and also in those from the Sangir islands, Halmahera, and the northern Philippines, Indian elements of characteristic type appear. Inasmuch as Indian culture impressed itself deeply on the Javanese during the early centuries of our era, and as the Hindu-Javanese kingdoms had wide trade and other relationships throughout the archipelago, it seems probable that the tale, wherever we find it here, may be traced to an Indian source.⁴ That such influences should extend as far north as the Tinguian may seem improbable, yet among this tribe other suggestions of Hindu influence may be traced, both in their mythology and in other features of their culture.

Thus far the area over which the story has been traced has been continuous or nearly so. We have now to consider two isolated in-

¹ Maxfield and Millington, *Visayan Folk-tales*, *Journ. Amer. Folk-lore*, vol. xx, pp. 95 sq.

² Seidenadel, *The First Grammar of the Language Spoken by the Bontoc Igorot*, Chicago, 1909, pp. 548 sq.

³ Cole, *Traditions of the Tinguian*, *Anthropological Series, Field Museum*, vol. xiv, no. 1, pp. 108 sq.

⁴ Cf. Pleyte, *op. cit.*, pp. 296, 306, where he adopts a contrary view.

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stances farther eastward. The first of these lies in the Banks and New Hebrides groups in eastern Melanesia. In these tales¹ the hero steals the wings of a sky-maiden, who, with her companions, flies down to bathe. He hides the wings and thus secures the maiden for his wife. She produces food magically, and for this is scolded by her mother-in-law or brother-in-law. As she sits weeping, her tears wash away the earth which covers her wings where they were hidden. Rejoiced at the discovery which gives her once more her freedom, she puts the wings on, and flies away. The husband then ascends to the upper world by means of the well-known arrow-chain, and as he is descending again, thinking that she is following him, she cuts the chain above him, and he is killed by the fall. It is to be observed that in one version the sky-maidens are called Vinmara, a term so similar to Widadari as to be very suggestive. If these New Hebridean versions had been encountered anywhere in the Indonesian area, one would be justified in regarding them as probably historically related to the other Indonesian versions, and as, with these, showing affiliation with Indian prototypes. Isolated as they are, however, the problem is not so simple. So far as I know, no versions of the tale have been recorded nearer than Nufoor; but it must be remembered that we have but the scantiest materials in the way of mythology from the Solomon islands, where, on *a priori* grounds, one might expect to find a linking form. On the other hand, inasmuch as there is considerable material now published from the Bismarck archipelago, the Admiralty islands, and parts of eastern New Guinea, it would seem that as no trace of the story has been found there, it can hardly be regarded as characteristic of the more purely Papuan or aboriginal population of the Melanesian area. The people of the New Hebrides are admittedly of complex origin, an older aboriginal stratum being overlaid by one or more immigrant strata, derived ultimately from Indonesia. This being so, the possibility of the tale under discussion being one of the many culture elements carried by the migrating ancestors from Indonesia to Melanesia, must be admitted. If we were dealing only with a few scattering cases of similarities in myths, the explanation of transference or transmission could hardly be regarded seriously. But as the number of cultural elements of all sorts, apparently thus derived, is large and varied, the conclusion is greatly strengthened.

The second isolated area in which the tale occurs is in New South Wales and Victoria. The first version,² from the Euahlayi tribe, runs as follows:

¹ Codrington, *The Melanesians*, pp. 172, 397 sq.; Suas in *Anthropos*, vol. VII, pp. 54 sq.; Macdonald in *Australasian Asso. Adv. Science*, vol. IV, pp. 731 sq.

² Parker, *Australian Legendary Tales*, pp. 44 sq.

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A hunter one day came upon a camp where seven girls were living, all alone. They were friendly to him, and allowed him to stay with them. They told him that they had come from a far-away country and would soon return thither. The next day he started on his way, but hid to watch the girls. They went out to dig ants' nests and left their digging-sticks while they sat down to eat. The hunter crept up, and stole two of the sticks. By and by the girls started back for their camp, but the two whose digging-sticks he had taken remained behind to search for them. He seized the two girls as they searched, and ultimately they agreed to become his wives. They told him, however, that they must never be forced to do what they did not want to, or else they would leave him. One day he ordered them to get for him some pine-bark; they told him this was something they must not do. He insisted, however. While they were climbing the tree to get the bark, the tree grew and carried them up with it to the sky, where they were welcomed by their five sisters who had returned thither some time before.

In this tale many of the elements of the story are missing, but these nearly all reappear in another version from Victoria (?).¹ According to this two sisters were bathing one day. They had wings so that they could fly away and escape men who wished to make them their wives. While their wings were laid aside, a man crept up, and, coming on them unawares, asked them to marry him. He was so handsome that they gradually relented, and finally consented to his proposals. These two tales are admittedly much less clearly a part of the Swan-maiden cycle than those that have previously been considered, yet present so many of the characteristics that one is tempted to regard them as possibly related.

In this connection mention must be made of the occurrence of a tale in New Zealand which may perhaps be regarded as showing the influence of the Swan-maiden incident. In the tales forming part of the Tawhaki cycle² a female sky-deity descends to earth and marries Kai-tangata, grandfather of Tawhaki. After she had borne her husband several children, she one day became displeased by some remarks he made to her. In consequence she resolved to leave him, and so, enveloped in a cloud, re-ascended to the sky. A similar incident is also told of Tawhaki's wife, with the additional feature of his ascent to the sky-world in search of her. Although current in several versions in New Zealand, the tale has not been reported from any other

¹ Dunlop in *Jour. Anthr. Inst. Great Britain and Ireland*, vol. xxviii, pp. 33 sq.

² White, *Ancient History of the Maori*, i, pp. 54, 87, 115, etc.; Grey, *Polynesian Mythology*, pp. 59 sq. Cf. also Leverd, *The Tahitian Version of Tafa'i (or Tawhaki)*, *Journ. Polynesian Soc.*, xxi, pp. 1 sq.

DIXON—SWAN-MAIDEN THEME

part of Polynesia, and as the Maoris show both in their mythology and in their other culture, elements of distinctly Melanesian origin, it is not impossible that we may see in this story a fragmentary and modified version of the Melanesian form of the Swan-maiden episode.

The thread which we have been following all the way from northern Sumatra, here becomes extremely weak. The assumption that the version of the story found in eastern Melanesia was derived from Indonesia was put forward with some misgiving; can we for a moment suppose that the Australian and Maori forms are also a part of the same line of influence? At first sight it seems preposterous, as no cultural associations have been seriously suggested between eastern Melanesia and the Australian continent at least. In justification for hazarding so wild a suggestion, it may be pointed out that a comparison of Australian and Melanesian mythology reveals several other similarities between the tribes of southeastern Australia and Melanesia. It would be foolish to assert that these few cases alone constitute evidence in the matter, but as there are also one or two puzzling cultural elements in common to the two regions, it suggests the need of further investigation in this hitherto unsuspected direction.

To return once more, however, to the Melanesian area. It seems that one result of importance follows from this hasty survey. If we admit the possibility that the New Hebridean versions of the Swan-maiden tale are derived from Indonesian sources, we must face the conclusion that inasmuch as the Indonesian versions are probably to be referred to Indian influence, the emigration from Indonesia which brought this tale to Melanesia, could not have taken place until after Indian culture had become established in Java and the adjacent islands. We should thus be led to believe that a considerable part of the Indonesian migration and influence in Melanesia occurred at least as late as the third or fourth century of our era, and that the complex of Melanesian culture, as we know it, has developed in the interval since. Even if we discard the possibility of the tale having been carried bodily with the immigrants to Melanesia, and regard it as merely transmitted, we must admit that Indian influences and doubtless others from Indonesia have come to Melanesia and possibly farther in comparatively recent times. Not a little other evidence, derived from other sides of Melanesian culture, seems to corroborate these conclusions, and a basis is thus secured for a tentative dating of an important culture period in the history of the Oceanic peoples.

HARVARD UNIVERSITY
CAMBRIDGE, MASSACHUSETTS

Some South American Petroglyphs

By WILLIAM CURTIS FARABEE



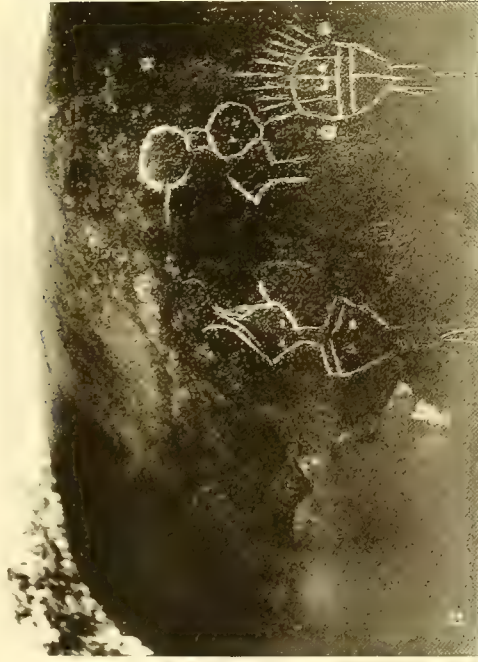
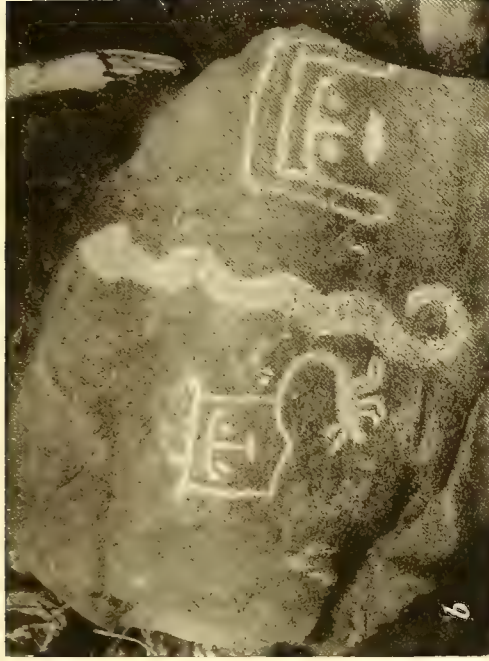
NCISED designs upon rock surfaces, known as petroglyphs, are of world-wide distribution and are very common over the northern part of South America, more particularly north of the Amazon river, in Brazil, the Guianas, and Venezuela.

For the greater part they occur along rivers, on the smooth surfaces of rocks, boulders, or cliff walls; at times they are high above the water, and again near the surface where they are covered and unseen during the long rainy seasons. Usually they are found in exposed places in plain view from the river, but they may be on the forest side of a boulder away from the river or on the flat tops of native rocks where it is necessary to stand on the surface to observe them. In all cases there are some in the near view to attract attention and lead to the discovery of remote ones. Often they are at suitable camping places or excellent fishing grounds, but they occur also on boulders in the midst of cataracts where they are difficult to reach, and again in the dry savannah country away from beaten paths or lines of travel.

On the University Museum's recent expedition across southern British Guiana and northern Brazil, many petroglyphs were encountered along the different rivers and in the savannahs traversed. At times they were too indistinct to trace with accuracy or too inaccessible to photograph, but drawings, photographs, or measurements were made of all that could be determined with certainty.

SAVANNAH

In the open savannah between the mountains of Makatawa and Makamintawa, three miles from the Wapisiana village of Aishalto, there are three granitic boulders covered with poorly-executed glyphs. Plate I will give an idea of the carvings, and the size and character of the rocks. The whole region is practically covered with rocks of the same character, but glyphs occur at this place only. There is no apparent reason why they should be here in preference to any other place; they are not near a spring, the river, nor any trail. A number of the designs are peculiar to this group, as the round head with rays and a mouth extending across the entire face, the diamond-shaped



PETROGLYPHS OF SOUTHERN BRITISH GUIANA
(*a, c*, On the Savannah. *b, d*, On the Cuduwini)

FARABEE—SOUTH AMERICAN PETROGLYPHS

superposed heads, and the footprint. The footprint is nearly half an inch deep, eight inches long, and five inches across the toes. All the toes are clearly marked, showing that it was meant to be the imprint of the right foot. None of the human figures is complete. The man with three strings of seven balls hanging from each arm has no legs. On top of the same rock is a rectangle having within three lines of seven balls each and another one with three lines of five balls each. In the photograph is one rectangle having small circles attached to the corners and seven cross-lines, and another with three cross-lines, making three squares, each of which has a smaller square within. There are also several separated figures of three concentric circles each, and other single circles with cross-lines at right angles. The only animal is a possible sting-ray three feet long.

CUDUWINI RIVER

Several days' journey from the savannah, in the depths of the forest, on the banks of the Cuduwini river, there is another group of loose rocks covered with designs. As will be seen from plate I, these are small, more or less angular detached rocks, lying about near the surface of the water where they would be concealed from view in the wet season. The site is a good camping place and fish are plentiful, but there are hundreds of places along the river where there are rocks at camping places and no glyphs appear. By comparing plates I and II and figure I it will be seen that the workmanship and designs here are very different from those on the savannah. There are many human heads, but no complete figure of a man. One body even has two heads. There are three methods used in making the eyes: the round dot, the small circle, and the dot within the circle. The mouth is either a line, a rectangle, or an inclosed line. There are also a fish, two

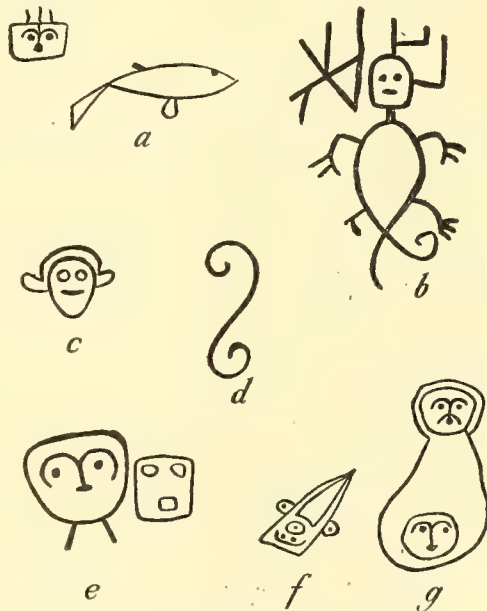


FIG. 1.—Petroglyphs on the Cuduwini.

HOLMES ANNIVERSARY VOLUME

monkeys, and two snakes. The snake shown in plate I, *b*, with the broad head and heavy body is evidently the very poisonous jararaca, common in the region. One monkey has a human head resting on his curved tail, and the other has a head-dress and a forked tail. In all, there were about thirty figures well enough preserved to copy.

ESSIQUIBO RIVER

A short distance above the mouth of the Cuduwini, on the west side of the Essiquibo, is a very large sloping granite rock extending 150 feet along the river and 60 feet out into the water during the dry season. It is a well-known rock and camping place, called Takarimi by the Wapisiana. On the most conspicuous part of the rock, where everyone who passes must see it, there is the splendid group, consisting of a snake, three monkeys, and three men, shown in plate II, *b*. The snake, made by drawing two parallel grooves three-quarters of an inch wide and an inch apart, is 12 feet 4 inches long and doubtless represents the anaconda, very common in the region at present, because the Tarumas, who occupy the territory, hold this animal sacred and on this account do not kill it. The six full figures of men all have solid eyes, one a solid head; four are made up of straight lines with right angles at the elbows; one has a body of two parallel lines, and one a six-sided body and straight legs

without knees and set at an angle to the body—a very well-proportioned man. One monkey is hanging by the tail from the branch of a tree, another has no hind legs. The upper figure of plate II gives a very good idea of the weathering of the rock itself and of the groove. In appearance the groove is as badly weathered as the rock, yet to the touch the groove is distinctly smoother.

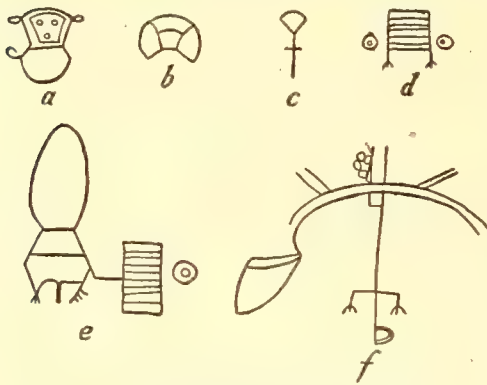
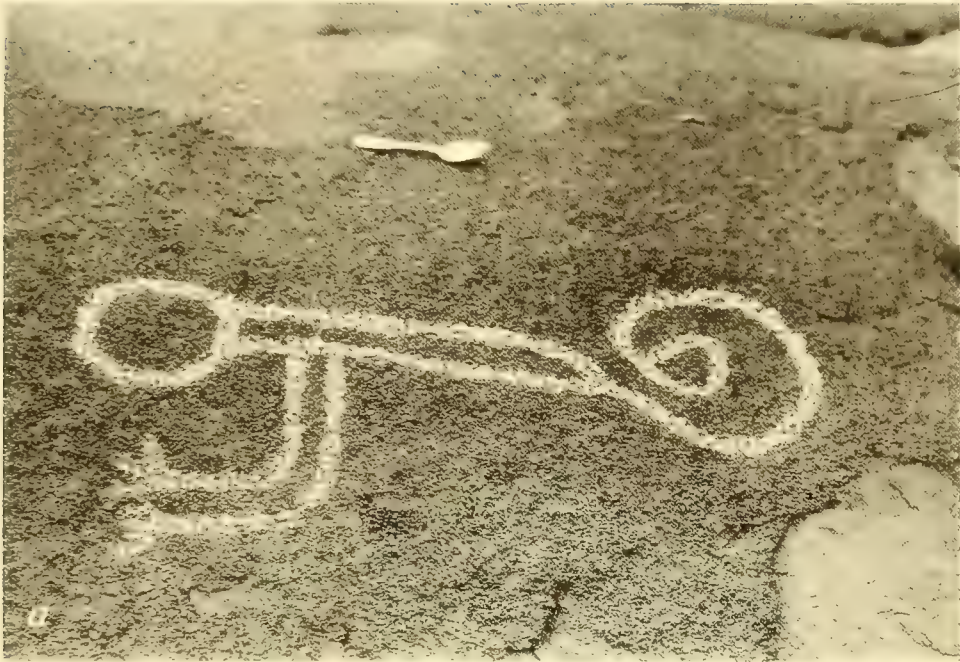


FIG. 2.—Petroglyphs on the Essiquibo.

Two days by canoe above the last location, on the same side of the river, at the Bubamana cataract, is another group of glyphs carved on rough angular blocks of porphyry. The work is not so well done, and the rock shows more weathering than at Takarimi. Figure 2 shows all the designs left sufficiently distinct to copy. The groups *d* and *e*, with inclosed parallel lines and circles at the side,



PETROGLYPHS ON THE ESSQUIBO

FARABEE—SOUTH AMERICAN PETROGLYPHS

are somewhat similar to those in the savannah. There are no figures here in common with any in the lower group on the river.

DUERWAU RIVER

Just below the cataracts, where the last group was observed, the Duerwau enters the Essiquibo from the west. Two days up this river at some rapids a few poorly made glyphs were found carved on granite boulders. Figure 3 shows all that were distinct. The man with rounded shoulders and knees is peculiar to this group. Figure 3, *b*, may be a coiled snake, the *sucurucu*, which is said to stand up and strike from the second coil.

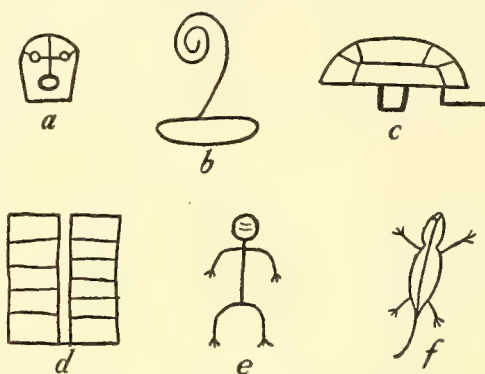


FIG. 3.—Petroglyphs on the Duerwau.

RIO HONAWAU

No other petroglyphs were found on the upper Essiquibo, nor on any of the numerous small rivers on the Brazilian side of the Acarai mountains until we reached the Honawau, a small tributary of the Apiniwau, which is the longest branch of the Trombetas. Here there are a few figures on a large granite boulder standing out in the rapid water away from the land. Figure 4 shows how different they are from any others so far described. Several appear to be houses, others may be men inside of their houses. The U-shaped figures are new forms also.



FIG. 4.—Petroglyphs on the lower Honawau.

Three days' journey farther up the river there is a large flat-topped rock, sloping to the water's edge in the dry season, which is completely covered with figures. They have been so defaced by the scaling of the rock that few were left perfect. The rectangular figures with cross-lines are similar to some of those in other groups. Figure 5, *h*, looks very much like a large burial urn. Again we find little in common between nearby groups.

HOLMES ANNIVERSARY VOLUME

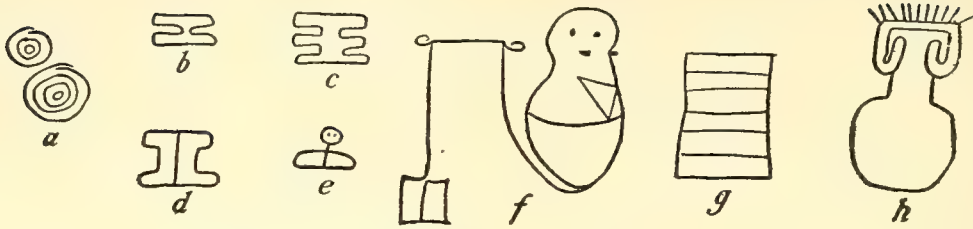


FIG. 5.—Petroglyphs on the upper Honawau.

DISCUSSION

The first question one asks himself when in the presence of these petroglyphs is, How were they made? They are always on durable rocks which are very difficult to work, even with modern implements. They are usually very well executed. The grooves are regular and show careful and exact work. An exception will be noticed in the carvings from the savannah, where the lines are often carelessly done; here they appear to have been made entirely by scratching with a stone having a sharp edge. The striations are clearly visible in the photographs. All the river specimens were rubbed smooth after they had been scratched or pecked to the desired depth. If they had been pecked and left without smoothing, they would have remained rough and weathered as rapidly as the rock surface. No implements were found about the rocks, and so were probably carried away for other use. Where the petroglyphs occur on high cliff-walls, now difficult or impossible of access, it does not necessarily prove that the same difficulty existed at the time they were made. A rock ledge or talus slope, since carried away by the river, may have given easy access to the location. Where they occur on fragments, they have not fallen from the cliffs but were made after the rocks had fallen, as is proved by the fact that the designs may be found on any side except the bottom.

The question of age is always an interesting one, but here there is very little direct evidence to assist in its determination. Indians occupying the regions where the glyphs occur know nothing of their origin or significance, and have no traditions nor beliefs regarding them. They were made by people who were accustomed to work in stone, but the present tribes use no stone implements. The rocks with glyphs in the savannah are in the region of the traditional home of the Wapisianas. The house of the god Tumincar was in a mountain near by. On one side is "virgin mountain", and on the other is the "virgin mountain's mate". There are traditions connected with all

FARABEE—SOUTH AMERICAN PETROGLYPHS

these mountains and all the Indians are well acquainted with them; but no one knows anything of the petroglyphs. From the negative evidence of the present peoples we must conclude that the glyphs are older than the immediate ancestors of the Indians. It may be objected that the present tribes have recently immigrated to these regions and could not be expected to have any knowledge of them, yet similar things are found in every part of the country.

The petroglyphs themselves give the best evidence of their age. In protected places, where they occur on overhanging rocks, the grooves exceed a quarter of an inch in depth, and it may be inferred that they were of the same depth on the upper exposed surfaces where the work was less difficult. The grooves were rubbed smooth and hence would erode less rapidly than the other rock surface. In some places the grooves have been further protected by deposits of oxide of iron. The grooves have remained smoother than the rock surface, making it possible to trace them by touch when they cannot be seen. This would prove that the rock has eroded to the depth of a quarter of an inch since the glyphs were made. While we can have no definite idea of the rate of erosion, not knowing all the conditions of climate, we know that granite decomposes very slowly and that it would require a very long time to erode to this depth—certainly so many generations that we should not expect any traditions of the makers of the glyphs to survive.

There has been a great deal of theorizing about the use and significance of petroglyphs. They have been thought to be everything from mere pastime occupations to serious historic records. The following is a list of the more plausible uses suggested: Marks to indicate fords, portages, and trails; fishing places; records of visits by individuals or tribes; records of personal encounters; tribal marks, totems, resorts, or boundaries; migration routes; astronomical purposes; records of myths; religious symbols. Many have attempted to interpret them by the use of known symbols used in other localities. This is a dangerous method, because they may not have symbolic significance at all, and, even if they have, the observed similarity is mere coincidence. It is highly improbable that they are the product of idle moments. The nature of primitive man would not lead him to spend his leisure in such difficult, painstaking, and continued labor. He could pass the time by doing absolutely nothing. Some of them may be at fording places, where the river can be crossed by passing from one rock to another when it would be impossible to cross in any other way without a canoe. In the same way they may mark the ends of trails which follow the line of outcrop across the lowlands. The out-

HOLMES ANNIVERSARY VOLUME

crop determines the location of ford, trail, and petroglyph. The belief that they were made by a cult or tribe that traveled over the country, leaving these glyphs behind them to mark their routes of migration, is interesting. Some Indians think they were left by the Incas and some students of ethnology think they were made by the Arawaks. The latter prove, by the distribution of the glyphs, that these people, coming from their original home in southern Brazil, crossed the Amazon at Itaicoatiari and spread out over the region to the northward, also that they did not occupy the lowlands along the Amazon, nor the great territory of the Purus, Jurua, and Javari rivers. It is true that no petroglyphs have been found in these regions, and it is also true that no rocks are found capable of bearing the glyphs. In the neighborhood of Itaicoatiari is the only outcrop of rocks in the Amazon river for two thousand miles. These simple facts are not allowed to interfere with a good theory.

If the records of glyphs are to be of any value, they should be carefully copied. They are usually indistinct and can be traced with difficulty. The smooth grooves may sometimes be followed by touch when they cannot be seen. Often it is sufficient to throw water over the rock and get the proper reflection of light to render them visible. The figures should be marked over with clay or chalk, or, failing these, a wax candle will serve very well, as the accompanying photographs will testify. No attempt at copying should be made until the whole group has been outlined. For the copy a light line is sufficient, but for the photograph the whole groove should be marked out to show its width. The photograph, with careful measurements for the scale, gives the best record. It is difficult to draw a faithful copy, however much time is expended. For an example, see the numerous publications of the Dighton rock "inscriptions". Many copies were made by well-trained, educated men, yet no one could possibly recognize the earlier copies from the later ones, or the original from any of them. One author thought them Phenician in origin, another Scythian, and a third Scandinavian, and each copied to suit his own preconceived idea. One's imagination can easily supply the missing line and make a monkey of a man. The camera has a good memory and no imagination.

No comparative study of petroglyphs from widely separated parts of the world, nor of those in nearby districts has been undertaken here, because it is felt that any attempt at interpretation of even a single group must be futile so long as there are no supporting facts. It is quite evident that many glyphs are not meant to be realistic, and those that are so meant may have very different interpretations. Simple line drawings of animals and men must necessarily resemble

FARABEE—SOUTH AMERICAN PETROGLYPHS

each other, but in one region the animal may be a clan totem, in another a personal record, and in a third, it may have no significance whatever—a mere portrayal of an animal. Conventionalism begins with the individual, and if he leaves no intermediate forms or other indication of meaning, the significance disappears with the author. In symbolism diverse significance may be attached to the same figure, and differing figures may be used to express the same thought. Hence resemblances between typical forms prove nothing—neither similar ideas, evidence of contact, nor routes of migration.


The study of petroglyphs is important because they are examples of early practices and the only evidence we have of an extinct culture. Whatever their significance may be, they are interesting to us because they are the first efforts by primitive man toward artistic presentation and mark a step in his evolution.

UNIVERSITY MUSEUM
PHILADELPHIA, PENNSYLVANIA

The Cliff-ruins in Fewkes Cañon, Mesa Verde National Park, Colorado

By *JESSE WALTER FEWKES*

INTRODUCTION

N the summer of 1915 the writer was detailed by the Smithsonian Institution, at the request of the Secretary of the Interior, to continue the work of excavation and repair of ruins in the Mesa Verde National Park, Colorado. A report on the general results was made to the Secretary of the Interior and published under the title, "Excavation and Repair of Sun Temple." In the course of the season's work the writer also excavated and repaired a cliff-dwelling, called Oak-tree House, in Fewkes cañon, west of the Sun Temple. The results of this work are treated in the present article.¹

The cañon referred to is a spur of Cliff cañon and extends in a northerly direction, separated from Cliff Palace cañon by a high precipice, an extension of Chapin mesa. On the top of this extension, somewhat back from the ruin, stands the mysterious building called the Sun Temple, excavated by the author in the summer of 1915. Fewkes cañon is of wonderful scenic beauty; it extends about half a mile in length, its depth is about eight hundred feet, and the walls are perpendicular, with the exception of a talus which covers the cañon wall for half its height. The cañon is well wooded with piñon, spruce, oak, and other trees. During heavy rains the water that flows over the rim at the head of the cañon forms a beautiful cascade. Not far from the cañon head, on top of the mesa, are level glades covered with sagebrush; here the cliff-dwellers once had their cornfields.

Before the summer of 1915 Fewkes cañon was rarely visited by travelers, its ruins being practically inaccessible, save to experienced mountain climbers. Its antiquities were not wholly unknown, however, for the cañon rim is in sight of Cliff Palace,—the most impressive cliff-dwelling in the Southwest,—and the ruins in its caves can be fairly well observed from the mesa above Cliff Palace. Prehistoric foot-and-hand holes cut by aborigines in the wall of Cliff Palace cañon

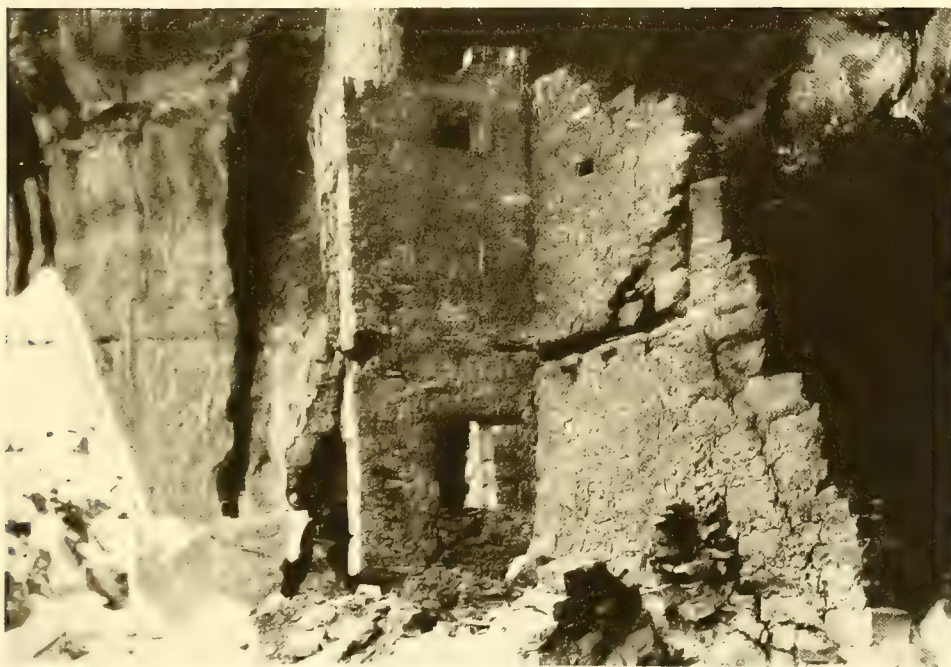
¹ Published by permission of the Secretary of the Smithsonian Institution and the Secretary of the Interior.



a. SMALL CLIFF-HOUSE (WILLOW HOUSE) ABOVE
THE TRAIL TO OAK-TREE HOUSE
(Photograph by Mrs C. R. Miller)



b. OAK-TREE HOUSE
(Photograph by T. G. Lemmon)



a. SPIRAL PICTOGRAPH AT HEAD OF FEWKES CAÑON

(Photograph by T. G. Lemmon)

b. WALL ABOVE KIVA D, OAK-TREE HOUSE

(Photograph by Mrs C. R. Miller)

FEWKES—RUINS IN FEWKES CAÑON

are remains of a trail from the Sun Temple to the top of the talus along which is a pathway to the Fewkes cañon ruins, namely, Oak-tree House and Painted House. The foot-holes from the cañon rim to this trail were so much worn and the face of the cliff so steep that the author built ladders above them. The visitor is now able to descend from the mesa rim opposite Cliff Palace to the top of the talus, and to follow the path around the point of Chapin mesa, making his way to the spring at the very end of Fewkes cañon. A part of the pathway above mentioned is situated below the perpendicular cliff on which stands the Sun Temple, under ruins of small, nameless cliff-houses situated in shallow caves of the northern wall of the cañon. One of these buildings, on the exterior surface of the wall of which plastering still adheres, is especially noticeable (pl. I, *a*); this may be called Willow House, from a few willows that grow along the trail below it. Below it, but above the trail, are the remains of another dilapidated inaccessible building. Following the talus pathway, on the eastern and northern sides of Fewkes cañon, about midway from mouth to head, one descends slightly to a small cluster of ancient oaks, growing about a circular depression, possibly the remains of a kiva, beyond which rise the ruined walls of Oak-tree House, the largest cliff-dwelling in Fewkes cañon. This structure, formerly known as Willow House, was excavated and repaired by the author in October, 1915, at the close of his work on the Sun Temple. About an equal distance northwest of Oak-tree House, and approached by the same trail, lies another ruin of considerable size, called Painted House, from paintings on its walls. Like its neighbor, Oak-tree House, this ruin is protected by an overhanging roof of a cave and is situated at the top of the talus on the northern side of Fewkes cañon. The few caves on the opposite or southern side of the cañon are small, and, as they lie in the shady side of the cliff, were not adaptable to winter use, hence they are devoid of cliff-houses of any considerable size. On a large rock in the floor of one of the largest and most conspicuous of these caverns there are still to be seen shallow parallel grooves made by the use of mealing stones. Near this cave can be traced fragments of an ancient wall, apparently the foundation of all that remains of a square tower. Somewhat back from the mesa rim, at the head of the cañon, is a petroglyph of spiral form (pl. II, *a*), similar to the Hopi symbol for a coiled snake, which marks the position of a fine spring in the head of the cañon below it. As the old Indian trail to the Sun Temple passes near this water symbol, one might well believe that the petroglyph was carved in this spot to indicate the site of the spring to passers-by.

HOLMES ANNIVERSARY VOLUME

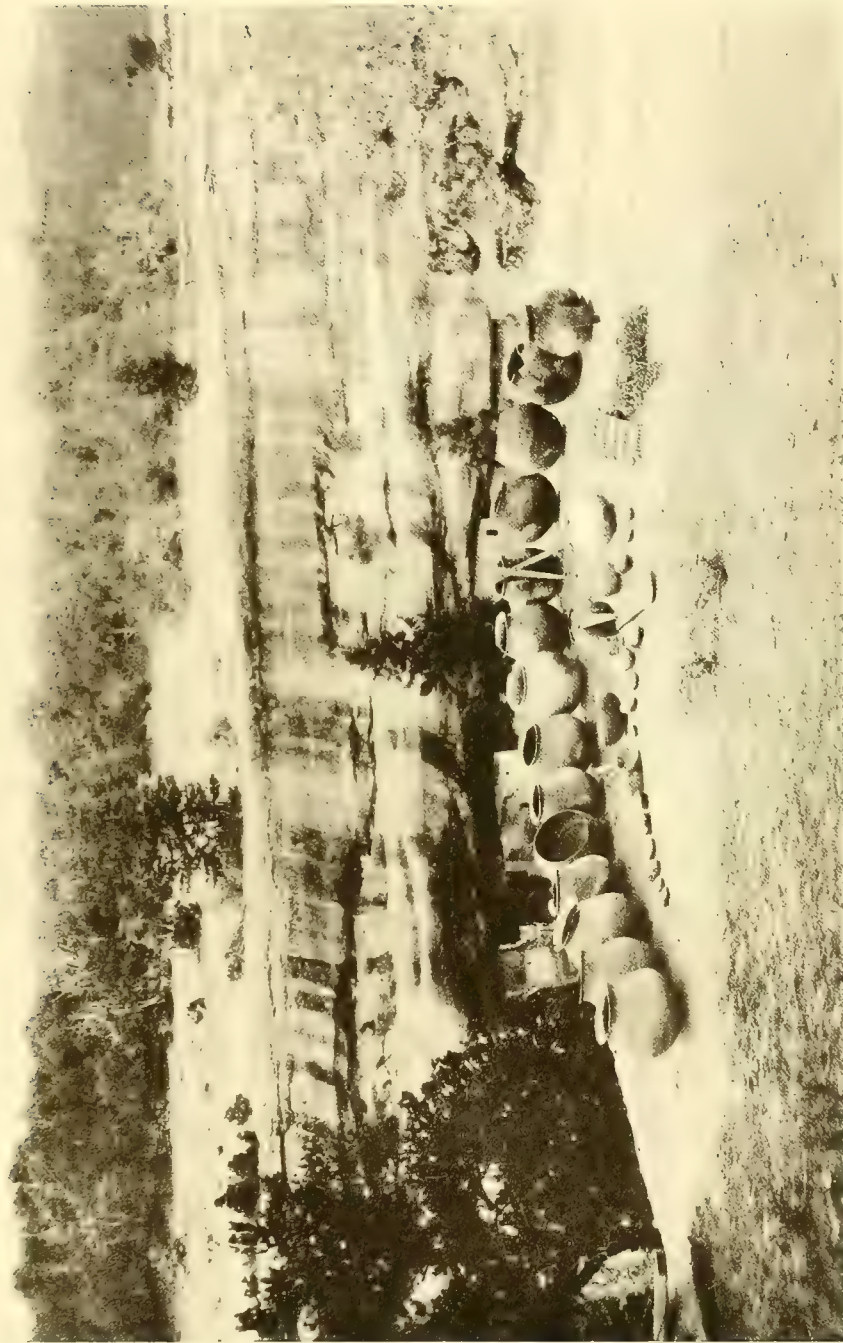
The cliff-ruins in Fewkes cañon, like most of the Mesa Verde cliff-dwellings, are situated at two levels, consisting of one building above the other, or an upper and a lower house. The architecture of the two tiers differs somewhat; especially is this true of Painted House, in which the lower structure is situated on the talus. Both show evidence of having been constructed at about the same time.

In 1908 a rude ladder was placed on the southern wall of Fewkes cañon, which enabled one to descend from the rim to the top of the talus, and a rude trail was made across the cañon to Oak-tree House. Another trail was built from Cliff Palace across Cliff cañon to its bottom and up the western side, a course which admits of improvement. The difficulty in reaching the level of the talus on which the ruins lie deterred many from visiting Oak-tree House in the past, but this difficulty no longer exists.

The cave in which Oak-tree House is situated is one of the most symmetrical in the Mesa Verde National Park, and can best be observed from a point on the mesa directly opposite, or across the cañon. The cave roof is composed of an upper and a lower arch, the outline of the former being almost symmetrical. The cave itself extends deep into the cliff, the height of the roof diminishing as the cave deepens. The overhanging roof of the cave completely covers and protects the cliff-house below, the walls of which occupy almost the entire floor of the cavern and project beyond the cave at both extremities. The remarkably picturesque ruin was perfectly shielded from cold winter winds of the north and from the blazing sun in summer. Many large trees grow on the talus in front of the cliff-house, concealing it on the southern side, protecting it from summer sun and winter cold; but, unfortunately for the photographer, rendering it difficult to obtain a good view of the walls of the ruin from the opposite side of the cañon (pl. I, *b*).

The small ruin (pl. I, *a*) in the cliff under the brow of the precipice on which the Sun Temple is situated is difficult of approach, but it has been entered by several visitors who report a well-plastered room with walls a little damaged. I do not regard this structure as a habitation, but more of the nature of a retreat for priests to pray for rain, as we know is customary at times among the Hopi. It is hardly large enough for the shelter of a considerable number of people, but it might have housed a single family. The theory, sometimes advanced, that this almost inaccessible building was used for storage purposes is possible, but cannot be proved.¹ Among the Hopi, sacred parapher-

¹ A mummy and several mortuary pottery vessels were found by Mr Jeep in the floor of this room in 1916.



E. E. Higley, Photo.

INDENTED WARE FROM DANIELS HOUSE

FEWKES—RUINS IN FEWKES CAÑON

nalía,¹ such as the serpent effigies of the Snake drama, or the ollas or pottery vessels used in the snake-washing ceremony, were formerly kept in caves outside the pueblos, lest they might harm the careless or the inquisitive, and some such thought might have been in the minds of the cliff-dwellers of the Mesa Verde. As bearing on the possible use of some of the more inaccessible small ruins as storage places, or receptacles for water vessels or for paraphernalia used for secular or religious purposes, I have introduced a photograph (pl. III) of the pottery found in 1914 by Mr Jeep in the cliff-ruin known as Daniels House.

GROUND-PLAN OF OAK-TREE HOUSE

The floor of the cave in which Oak-tree House stands has an uneven surface and is covered with boulders. It measures about 100 feet in length, from east to west, and 75 feet in breadth, from north to south. As in the case of most Mesa Verde cliff-dwellings of its type, the ruin is divided into two sections: one, the smaller, on a ledge in the cliff at one side and above, the other situated on the same level as the top of the talus.

The ground-plan (fig. 1) of Oak-tree House cannot be called characteristic, but resembles that of Spruce-tree House and some of the other cliff-houses in the Mesa Verde National Park. Greater or lesser modifications, as shown in the accompanying plan, have resulted from destruction of walls by the falling of large stones from the roof of the cave, which have practically demolished almost all the walls of the western end of the structure. The foundations of these walls are of course buried beneath the fallen rocks. The ruin shows two types of rooms—secular or domiciliary, and ceremonial chambers or kivas. The latter have the best masonry and are the most characteristic.

The kivas, as a rule, are found in front of secular rooms. There are no refuse heaps of considerable size back of the secular rooms, or in the rear of the cave, although there are recesses and a few dark rooms whose rear is formed by the wall of the cave, an exceptional feature in the Mesa Verde ruins.

¹ Some of the effigies of the Plumed Serpent used in the March festival are now kept in four jars set in the masonry of a banquette of a room in the pueblo of Hano. The covers of the jars are so cleverly luted in the surface of the banquette that they are thoroughly hidden from view; in fact, I slept on the banquette during several weeks without intimation that the serpent effigies were beneath me. The old shrine in which the effigies were formerly kept is a cave on the western side of the mesa, north of Hano pueblo. In 1900 a few hoops and broken heads of the effigies were all that remained there, although the place is still regarded as the ancient home of the Great Serpent effigies. It was abandoned many years ago as a receptacle of the effigies on account of its exposed position. The bowl in which the reptiles used in the Snake dance at Walpi are washed, and the vases in which they are kept during the exercises in the kiva, are kept in a cave in the mesa cliff west of Walpi.

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Many of the secular rooms at the rear of the cave must have been very dark chambers, having neither doors nor windows. Some of these rooms were probably used for storage, but human burials, accompanied with mortuary bowls, vases, and other offerings, have been found under their floors. Refuse heaps like those found back of the rear walls of Spruce-tree House were not discovered. Human skulls or mummies were not uncovered by the author in this ruin, but as fragments of human hair and various long-bones occurred in the débris on the floor, it is supposed that the other parts of burials had been removed by previous diggers. Like those of all other cliff-dwellings in the Mesa Verde, the rooms of this one had been dug into

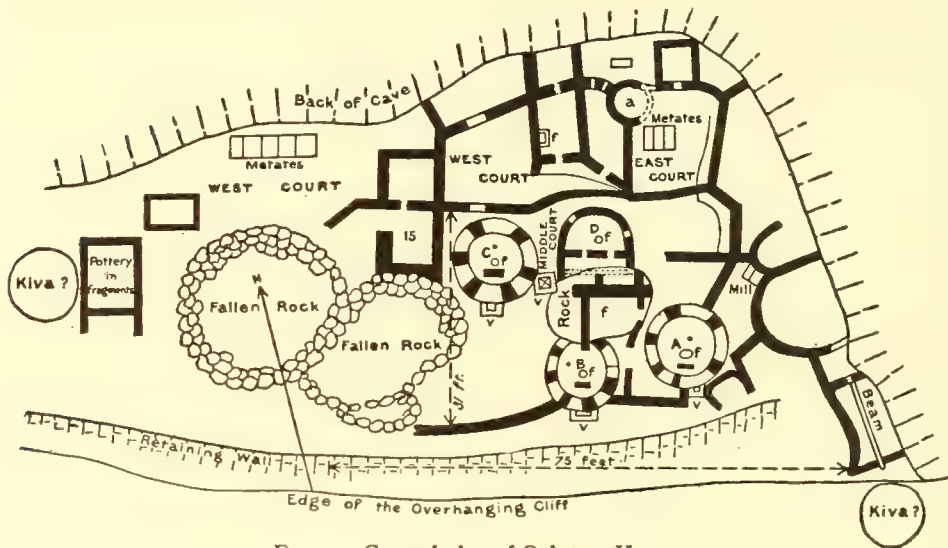


FIG. 1.—Ground-plan of Oak-tree House.

and its walls mutilated in the search for pottery and other artifacts before the author began his work, and the few things found were only those that had been overlooked by relic-hunters. As compared with Cliff Palace, there was a relatively large number of kiva beams. Many walls of this ruin were in a better condition than those of Spruce-tree House. The scarcity of beams in Cliff Palace indicates either their removal by the cliff-dwellers for use in the erection of other buildings, or possibly they had been taken by vandals for firewood. A few roof and floor beams still remain in place,¹ but almost every floor had

¹A number of beams that had fallen into the kivas were restored to their former places, as nearly as could be determined.

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previously been dug into and standing walls had been torn down to admit light for the pot-hunters. Many walls were left tottering on their foundations; others were completely broken through to afford access to the rear rooms.

The entire ground-plan (fig. 1) of Oak-tree House is somewhat difficult to trace on account of the destruction of the eastern and western ends. The kivas of these parts are practically gone, but rooms in the deeper portions of the cave are protected by the cavern roof and the walls of these are fairly well preserved. The kivas were buried in *débris*, but their walls are only slightly mutilated.

The largest and most conspicuous fragment of masonry above ground (pl. II, *b*) stands on top of a large rock (*f*) fallen from the roof of the cave before any of the habitations were constructed. This rock projects over a section of the wall of Kiva B on one side, and of Kiva D on the other, a relation showing that these rooms were constructed after the rock had fallen, otherwise the masonry of the rooms would have been crushed by the fall.

Of the two types of rooms in Oak-tree House, sacred and secular, the former are circular, resembling in structural features the type of kiva common in the cliff-houses of the Mesa Verde and the McElmo, Chaco, and other cañons of the upper San Juan valley. The kivas are, as a rule, subterranean, and the roofs, now destroyed, were vaulted inside in much the same way as those of Spruce-tree House. The indications are that these rooms were entered from the roof by means of ladders, and that the exterior of the roof was level with the courts. The roofs were supported by pilasters projecting from the inner walls, generally six in number, with recesses between, in which banquettes were built. Small square niches, generally situated in the wall below the level of the tops of the banquettes, served as receptacles for sacred meal, medicine bowls, and other objects. The fireplace, which still contains wood ashes, is a circular depression in the floor near the middle of the room. The smoke of former fires made its way through the hatchway, and fresh air was admitted at the level of the floor by a horizontal flue and a vertical shaft. There was an upright slab of stone or a wall of the same material which served as a deflector, set in the floor between the firepit and the opening of the air-shaft, as has been shown elsewhere to be the case in the Spruce-tree House and the Cliff Palace kivas. The small opening in the floor comparable with the ceremonial sipapu of Hopi kivas, exists in several of the ceremonial rooms at Oak-tree House.

The two most remarkable chambers in this ruin are the D-shaped Kiva D, and a non-ceremonial circular room (*a*) in the rear of the cave,

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the walls of which are made of adobe supported by upright posts interwoven with sticks or withes.

The masonry of this ruin, as a rule, has the defect characteristic of other Mesa Verde cliff-houses, namely, the joints of the stonework are rarely "broken" and the corners are seldom bonded. One or two walls compare favorably with the best of those within the limits of the Park, but generally the surface of the wall is so concealed by plastering that it is difficult to judge accurately of its character. The windows and doorways, in one or two instances, present masonry as good as any known in prehistoric pueblos, as for instance the T-shaped window in the second story of one of the highest halls.

KIVAS

When the excavations were commenced there were indications of at least six kivas in Oak-tree House, four of which, situated under the cave roof, were in a fairly good state of preservation, the remaining two—one at the eastern and the other at the western end—having been so exposed to the elements that they were almost completely destroyed. Three of the well-preserved kivas belong to the vaulted-roof type in Cliff Palace and Spruce-tree House; the exceptional form in the fourth (D) belongs to the second type and shows certain differences, mainly in shape, from that of any known kiva. Formerly there may have been similar kivas, now covered by fallen walls and stones that had dropped from the roof of the cave, but if they existed it is now impossible to determine their character or form. Although, with an exception of Kiva A, kiva roof-timbers are no longer in place, it was found on excavation that the pilasters and banquettes are well preserved, and in several instances one or two of the logs that formerly supported the roof were found in the kiva chamber. The four best-preserved kivas lie midway of the length of the ruin and well to the front of the cave, and are backed by secular rooms, from which they are separated by sections of the courts, the level of the plaza floor being the same as the former roof of the kiva. The court at the eastern end has three or four metatakis, or grinding bins with metates, formed of slabs of stone set on edge in the floor. The western court is separated from the top of Kiva C by a low wall that girts a slightly elevated platform. Between the most westerly of the rocks that have fallen from the roof and the rear of the cave is an open space in which are four grinding stones.

Kiva A.—Kiva A is situated near the eastern end of Oak-tree House, and is one of the best preserved in the whole ruin. Its walls are little broken down, and the floor was found to be in excellent con-



EAST BUILDING OF OAK-TREE HOUSE

Mrs C. R. Miller, Photo.

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dition. A few roof-beams extend from one pilaster to another, their ends being still bound in place with yucca strings. This is one of the few kivas in the Mesa Verde National Park that show a peg on the inner wall of the kiva, on top of a pilaster, at the end of a roof-beam. Diameter, $14\frac{1}{2}$ feet.

Kiva B.—The diameter of Kiva B is practically identical with that of Kiva A; its floor and walls are likewise well preserved. A feature of this kiva is a banquette built under a huge rock (*f*) fallen from the cave roof. The size of this banquette is so much greater than the others in the kiva, that it resembles a shelf, extending along the northern side of the room. A fine black-and-white vase of sugar-bowl pattern, containing a cake of granular salt,¹ rested on this banquette. The vertical shaft of the ventilator in Kiva B was much mutilated, but from what remains it was seemingly of the same type as structures of like function in vaulted-roof kivas.

Kiva C.—Although Kiva C is slightly larger than either A or B, its structural features, which are well preserved, are practically identical with them. Like the other kivas it was almost completely filled with fallen masonry and other débris. Diameter, 15 feet.

Kiva D.—The shape of Kiva D is so unlike that of circular ceremonial rooms that at first sight the identity of this chamber was not recognized, but after removing the débris and examining the floor, little doubt remained that it belongs to the second type. Diameter, 11 feet.

Its general form is semicircular, the northern wall being regularly curved, the southern straight. The surface of the walls is smoke-blackened. On the southern side, below a large boulder, there is a rectangular room which communicates with the main or semicircular chamber by two passageways, one on each side of a middle line. The floor of the D-shaped portion of the kiva has a fire-hole, but it is without a sipapu, or ceremonial opening. In the relative position where this orifice ordinarily occurs there was found a stone embedded in the floor, flat on the lower and convex on the upper surface, which at first was supposed to cover a sipapu, but, when this stone was raised, no ceremonial opening was found.

The vertical shaft of the ventilator of this kiva communicates with the rectangular room, and while it has the same appearance as the flues of other kivas, it does not open into the room in the usual

¹ Particular interest clusters about this cake of salt from its bearing on Cushing's theory of the existence of a prehistoric trade-route between the San Juan cliff-dwellers and the Zuñi, and the distribution of the round type of pueblos characteristic of prehistoric Keres ruins. The character of the salt cake from Oak-tree House resembles, from its granular appearance, that from the Zuñi Salt Lake.

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manner, at or near the middle of the wall, but near one corner, or where the inner straight wall of the rectangular chamber joins the curved inner wall of the main room, a position into which it was probably forced by the existence of a large fallen rock which covers this end of the kiva. Two sticks placed diagonally in the walls of the external opening of the vertical shaft cross each other, limiting the size of the aperture, which is too small for passage by a human being. Similar sticks are found in the shafts of some of the circular Mesa Verde kivas, indicating that the vertical shaft in Kiva D is the same as the shafts in circular subterranean kivas where there is no differentiation of the space back of the deflector into a rectangular chamber.

The rectangular room above mentioned is unique in kivas of Mesa Verde cliff-dwellings. If the vertical shaft may be regarded as a ventilator, one of the straight walls forming the rectangular room might be comparable with the deflector; through it two passageways open side by side into the main or D-shaped chamber. The rectangular chamber, morphologically representing the space in circular kivas between the deflector and the wall, may be interpreted as a room in which personators or actors in ceremonial dramas remained until the time for them to emerge through the doorways into the main room. If such were its use, the object of the vertical flue might then be to supply fresh air, just as in other cases it served for ventilation of the whole kiva.

The walls of Kiva D have no columns or pilasters with intervening banquettes, but there are two breaks in the top of the walls that suggest places for parallel supports for the rafters of a flat roof, a well-known characteristic of kivas of the second type.

SECULAR ROOMS

Most of the secular rooms of Oak-tree House exhibit no striking peculiarities. They vary in size and shape, filling the rear of the cave and extending round the eastern and western ends. These living rooms were doubtless used as sleeping quarters and possibly for storage; the corn-grinding, cooking, and other domestic occupations were more commonly confined to the terraces or open plazas, where fireplaces are indicated by depressions in the floor and by smoke discoloration. The walls of these rooms, as a rule, are intact but roofless; they show no evidence of former roof beams, the cliff itself furnishing the side walls of the rear rooms, and in a few instances the roofs. Skeletons and offerings to the dead have been found under the floors of some of these rooms.



a. EASTERN ROOMS OF PAINTED HOUSE
b. WALL ABOVE KIVA D, OAK-TREE HOUSE

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At the right, as one enters the ruin from the eastern end, there are several high walls fairly well preserved, which indicate that the eastern end of the building was formerly three stories high, north of which the structure was four stories high with a curved front wall, recalling a room of similar shape in the same relative position in Spruce-tree House. The walls of all these rooms are constructed of stone laid in adobe mortar, the component stones sometimes having been artificially pecked with stone implements or smoothed by rubbing, the joints being wide and well chinked with spalls. Externally the walls were once covered with plaster, but it has now disappeared from many of the rooms.

A view of the exterior room with the round front wall is shown in plate IV. The two openings in this wall, one of which is practically rectangular, while the other is of the well-known T-shape, were entrances respectively to the second and third-story rooms, the line of the floor being indicated by an irregular hole above the lower opening. Here rested one end of a beam, now gone, which supported a floor. The upper opening, with well-formed sides, is closed by a slab of stone. This opening was the doorway by which one entered the upper room from a balcony below, as is indicated by a projecting stone, forming a step, conveniently placed just below the threshold shown in the illustration. Similar stepping-stones are found in walls below doorways in Cliff Palace and other Mesa Verde cliff-dwellings. It will be observed that the masonry of the lower part of the curved wall is composed of larger stones than that of the upper part, a feature common in pueblo construction.

The best-preserved wall of Oak-tree House, shown in plate V, *b*, rises from the top of a large fallen mass of rock about midway in the ruin between Kiva B and Kiva D. This belongs to a building two stories high; the openings and ledges for the floor-beams are still well marked. The two square openings, facing westward, and a third somewhat smaller, are well made and probably served as windows. The masonry, especially about the windows, is among the best found in the Mesa Verde. The wall surfaces are plastered inside and out, the stones artificially worked though not bonded, and the corners vertical.

Near the northwestern angle of an open court there remains about half of the wall of a room (*a*) of exceptional construction, in that it is not built of masonry, but of intertwined willow or other saplings and sticks, set in adobe mud, plastered inside and out with the same material. The wall is black with smoke from the floor to the top of the cave, which is here quite low and forms the roof of the structure, a

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feature not exceptional in Mesa Verde ruins. The part of the wall still standing has no external opening. Before its partial destruction this wall extended to the wall of an adjoining room.

The inclosure formed by this wall, which is exceptionally well built, was probably used as a granary, and the part destroyed no doubt contained a passageway. Similarly constructed walls, which occur frequently in the cliff-dwellings of northern Arizona, are also found elsewhere on the Mesa Verde as mentioned by Nordenskiöld. They may be the counterparts of the olla-like granaries built in front of living rooms of the cliff-dwellings of the Sierra Madre in Chihuahua.

On the ledge above the eastern end of Oak-tree House are walls of a house, practically inaccessible, but readily seen from below. I have made no special studies of this portion of the ruin, as I have not entered it. As seen from the opposite side of Fewkes cañon it appears to be a building of considerable size.

The question naturally arises, Since an upper and a lower building are present in many of the Mesa Verde cliff-houses, what is the relation of the two? As a rule the ceremonial rooms in the lower are found generally on top of the talus, where the cave is deeper and the available space greater. The scant evidence available seems to indicate that the walls of the large rooms or upper houses are as a rule of poorer masonry and are not accompanied with kivas; but there are exceptions to both cases. I am inclined to believe that the more inaccessible ledge houses were used for storage rather than for habitation, and were constructed practically at the same time as the larger buildings on top of the talus.

PAINTED HOUSE

Continuing along the trail west of Oak-tree House the visitor reaches a ruin different from it and quite unlike any cliff-dwelling in the Mesa Verde National Park yet described. This ruin, called Painted House, like Oak-tree House is composed of an upper and a lower section, shown in the accompanying plate VI, *a*, *b*. The chief peculiarity of this structure is the absence of round rooms, or kivas, and the presence of massive walled rooms at each end of an extended open space, one side of which is formed by the wall of the cliff. This peculiar feature of the lower building is not true of the upper or ledge house, which leads to the belief that the latter was the less important, the lower building being the main structure.

Painted House has been referred to as an elongated court with massive buildings attached at each end. One side of this court,

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which may have been a room, was the cliff wall; the opposite side or front wall has fallen and was possibly a low wall. The rear of the room or court formed by the back of the cave has a banquette a few feet high and wide, the surface of which is painted white and red. The lower part of the latter color resembles a dado with triangular figures at intervals, the triangles being bordered with rows of dots, a form of decoration still used in modern Hopi rooms. The rooms at the extremities of this court are two or more stories high and have massive walls, the tops of which are partly mutilated. From their relative position these may be known as the eastern and western rooms. There is no decisive evidence that the court was roofed, but the terminal building exhibits holes for rafters.

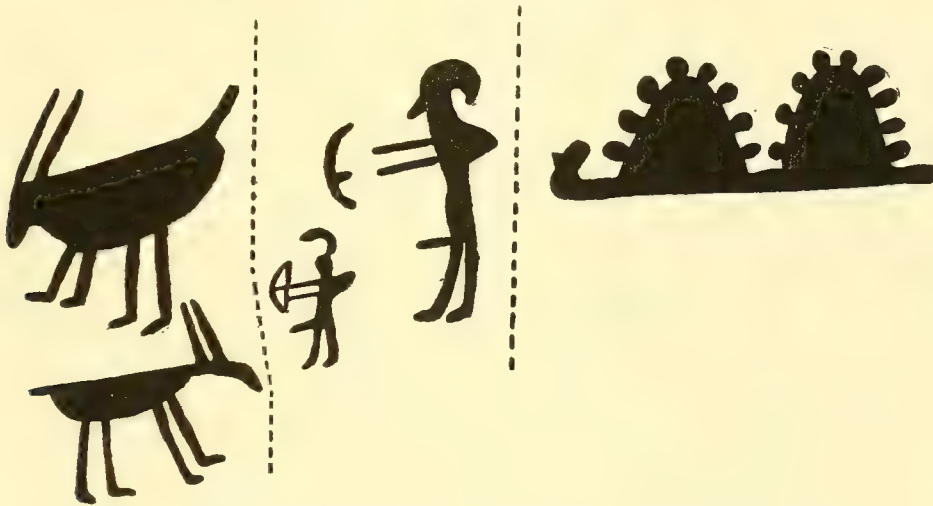


FIG. 2.—Paintings of animals and men in the western room of Painted House.

The western wall of the eastern room facing the court is partially broken at one end, but the rear wall on the cave side is intact. Between this part of the wall and the other end, the masonry terminates, evidently to provide a passage from the roof of the court to that of the second story of the western room. Remains of white plastering (pl. v, *a*) are found on the inner wall of this room, which corresponds with the northern wall of the court.

The rooms at the western end of the court are somewhat larger than those at the eastern end, and are better preserved. The lower-story wall of one of the western rooms is ornamented with figures (fig. 2) painted red on white plastering. Other figures (pl. vii) are con-

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fined to the northern and eastern, and a part of the western wall; the southern wall, having fallen, shows no pictures. The majority of these paintings are damaged or wholly illegible, but such as remain, shown in the accompanying illustrations, represent rain-clouds, various species of animals, and human beings. Two of the latter have been purposely erased by some visitor, but from drawings lent by Dr Kidder it will be evident that the figures resemble a phallic being and suggest the Hopi katchina called Kokopelli, associated with fire ceremonies. It is possible that New Fire ceremonies not unlike those of present Pueblos were once performed in this chamber, in which case possibly the court may have been used for the performance of the elaborate dances that accompany this rite.

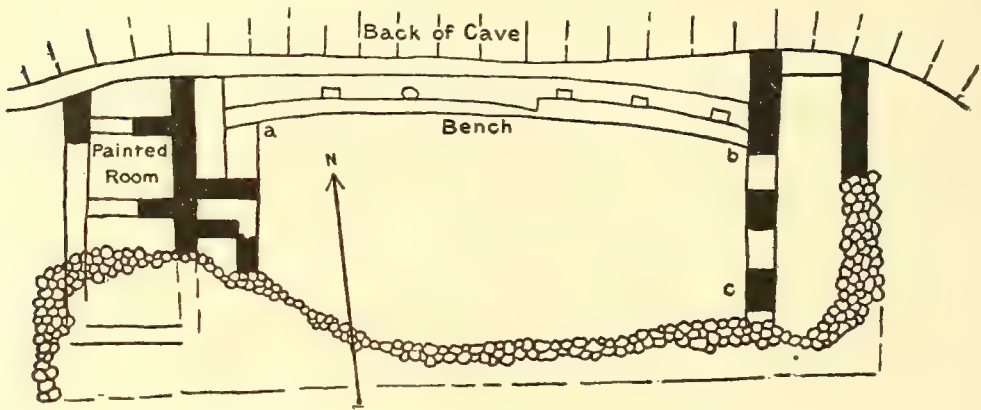
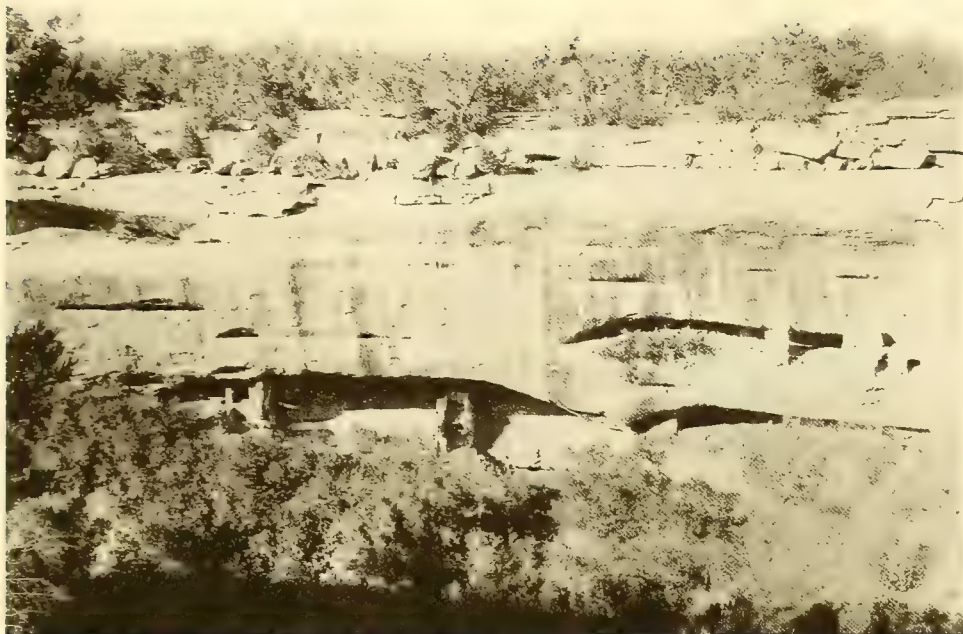


FIG. 3.—Ground-plan of Painted House.

In studying the ground-plan (fig. 3) of Painted House it will be noticed that, although this ruin is by no means a small one, there are no signs of circular kivas so constant in Mesa Verde cliff-dwellings, but that the structure consists of a long room, or court, with houses at each end. This court may have been used for ceremonial dances and the rectangular rooms built for secret rites. The paintings on the rear or northern wall of the court and the existence of square rafter holes along its face, favor the belief that this court once had a roof.

At a higher level on a ledge of the cliff, to the east, above the top of the talus on which Painted House stands, there are the fallen walls of several rooms which may be regarded as connected with the main structure. The most easterly of these rooms were two-storied, a line



T. G. Lemmon, Photo.

a. VIEW OF PAINTED HOUSE
b. UPPER BUILDING OF PAINTED HOUSE

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of holes for the roof beams of the lower story or the floor of the second story being seen in plate VI, *b*.

There was probably a round inclosure in the eastern end of the ledge of the upper building of Painted House, as indicated by fallen masonry which suggests a circular kiva. On a ledge in the cliff below the upper building of Painted House, about on the same level as the roof of the court, there are walls of rooms, very much dilapidated.

POTTERY

All the specimens of decorated pottery found in Oak-tree House belong to the archaic black-and-white and red types characteristic of Mesa Verde cliff-dwellings. There were found corrugated, rough ware cooking-pots; coiled vessels; indented ware; smooth ware, with

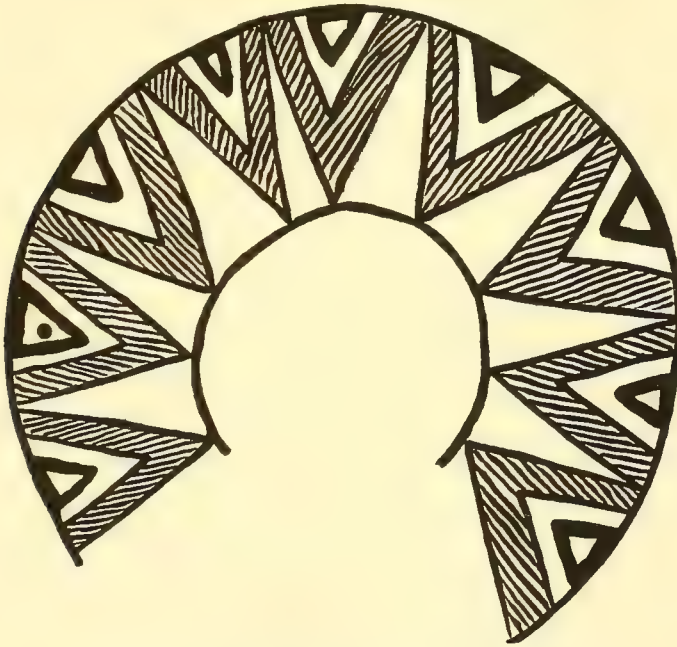


FIG. 4.—Design on the vessel shown in plate VIII, *a*.

and without designs, colored black and white, and red. The best examples of the black-and-white ware are illustrated in plate VIII. When decorated, this pottery bears geometrical designs characteristic of pre-Pueblo pottery and the same as that from Spruce-tree House and Cliff Palace. The collection contains several circular clay discs, evidently covers for earthenware vessels. The accompanying figures

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represent geometric patterns on two of the best black-and-white vessels. No effigy vases were found, and no life forms depicted.

On the whole, no distinctly characteristic design appears on ceramic objects from this ruin. The best specimen is a vase (pl. VIII, *a*), found in Kiva B. This vase has a circular cover and contained a desiccated lizard and a cake of common salt. A small black-and-white food bowl (*b*) has two footprints painted on the inside.

The designs on pottery from Oak-tree House are practically the same as those on bowls and vases from other sections of the culture area to which the Mesa Verde belongs. Similar geometric figures occur

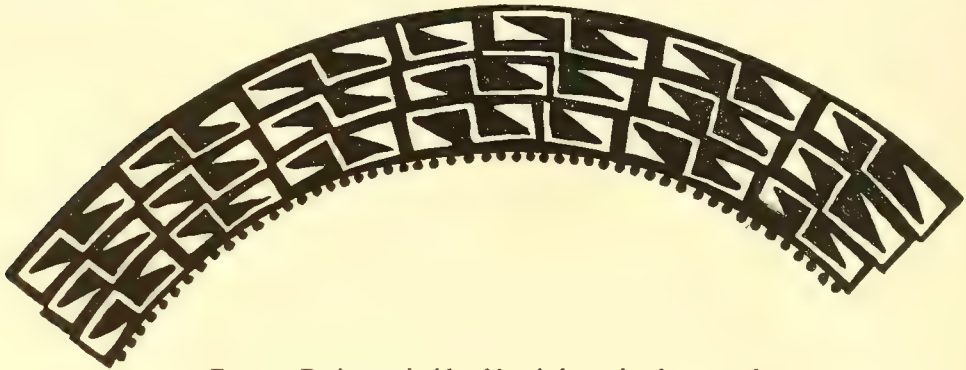


FIG. 5.—Design on inside of bowl shown in plate VIII, *b*.

on earthenware from ruins along the Animas, near Aztec, in the Chaco and Chelly cañons, on the McElmo and its tributaries, and elsewhere. As a whole the symbolism of the Mesa Verde pottery is simple (figs. 4, 5) and is not to be compared with that of the Sikyatki or the Mimbres ware, which, from the pictorial point of view, is highly differentiated. As a rule cliff-dwelling pottery belongs to the oldest forms of ware, the smooth decorated specimens closely resembling those from the single-house or pre-Pueblo epoch. Nevertheless, it is well made and beautifully decorated. The majority of the whole pieces are mortuary in character. Sherds of many vessels were taken from one of the rooms at the western end of the ruin; among these, coiled and indented ware was more abundant than painted fragments. The presence of red-ware sherds among the black-and-white is quite in keeping with what is known of Mesa Verde pottery, which is mainly made up of earthenware of these two kinds. No whole piece of red ware was found at Oak-tree House.

The forms of the indented type of pottery are identical with those elsewhere recorded from the Mesa Verde. Of this type vases and



ANIMAL AND HUMAN FIGURES IN WEST ROOM OF PAINTED HOUSE
(a, b, west wall; c-f, north wall; g-l, east wall)

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food bowls are the most common; the former have the "sugar-bowl" form. The mugs, like those of the Mancos-McElmo sub-area, are slightly larger at the bottom than at the top. Ladles have the same general form and are similarly decorated.

STONE AND CLAY IMPLEMENTS

The stone implements, as axes, celts, metates, manos, and the like, afford nothing new in form. Several pestles, some made of stone, others of clay, found in the débris of Oak-tree House, represent a rare type. Those here figured (figs. 6, 7), representative of several

specimens, appear to have been once used as paint grinders. Objects of the same form made of clay (fig. 8), too fragile for great percussion, lead one to doubt the generally accepted theory that they were devoted to the same use as the stone forms. Several flat stones found in Kiva C of Oak-tree House had pigment still adhering to them. A circular object (fig. 9) is probably the cover of a vase. Similar covers of stone or clay, sometimes with a knob or handle, are not rare.

One of the instructive objects found in Kiva B of

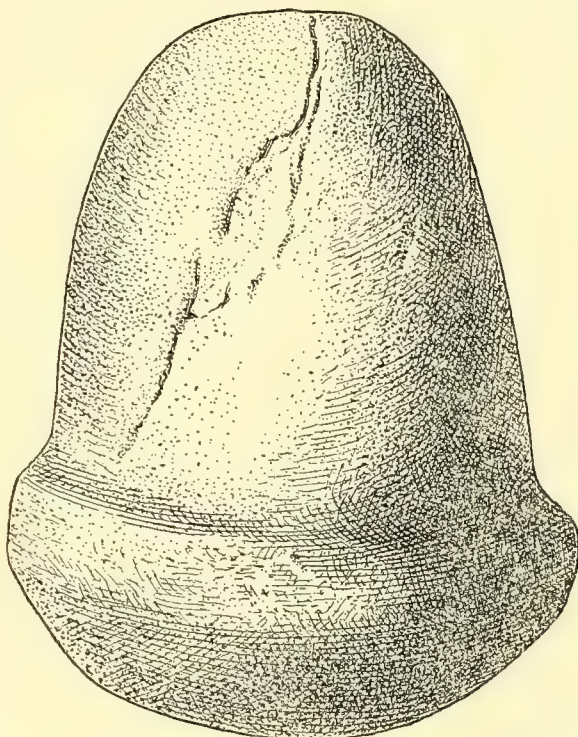


FIG. 6.—Stone pestle from Oak-tree House.

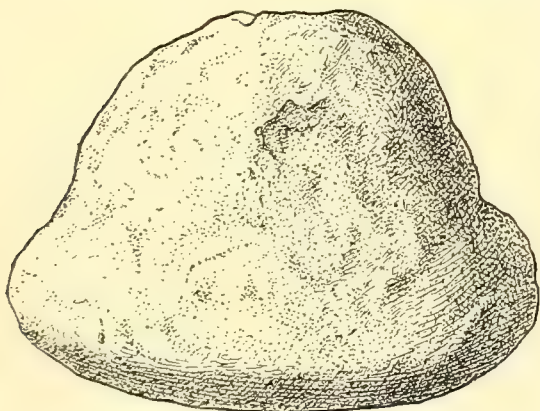


FIG. 7.—Clay object from Oak-tree House.

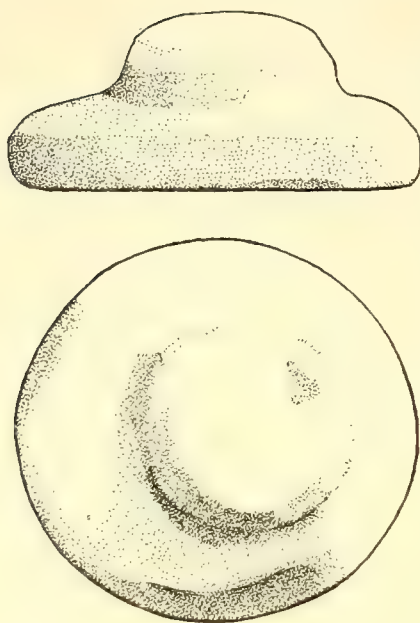


FIG. 8.—Cover of vase from Oak-tree House.

resented in plate CLXX, 2, is made of unbaked clay, and has a reticulated surface, as if once incrustated with foreign objects. The Hopi who were at work for me declared that this incrustation had been composed of seeds (corn), and that the pits over the surface of the clay cone were evidence of their former existence. They identified this object as a 'corn mound' and reminded me that a similar object is now used in the *Powamu*, *Lalakonti*, and certain other ceremonies. . . . These corn mounds are

Oak-tree House is a conoid stone with flat base of oval outline. The sides are slightly curved, converging in a blunt apex. This specimen is practically identical in shape with one from Cliff Palace, mentioned elsewhere.¹ The Hopi use on their altars similar objects made of wood, stone, or clay, and call them idols of Alosaka or Muyinwu, germ gods, or simply "corn mounds" (kaetukwi). Those of the two basket dances (Lalakonti and Owakulti) have been mentioned and figured elsewhere, as likewise has the "corn mound" of the Powamu and New Fire rites. I have also figured and described prehistoric "corn mounds", one of which was found in a grave at Sikyatki at the East Mesa of the Hopi.

"Among many other mortuary offerings was one which was particularly suggestive. This specimen, rep-

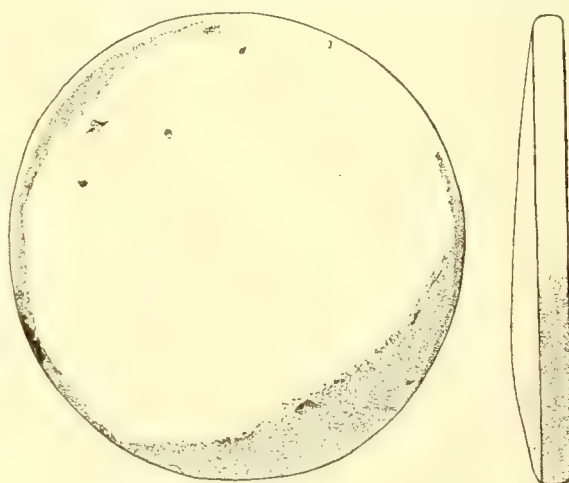
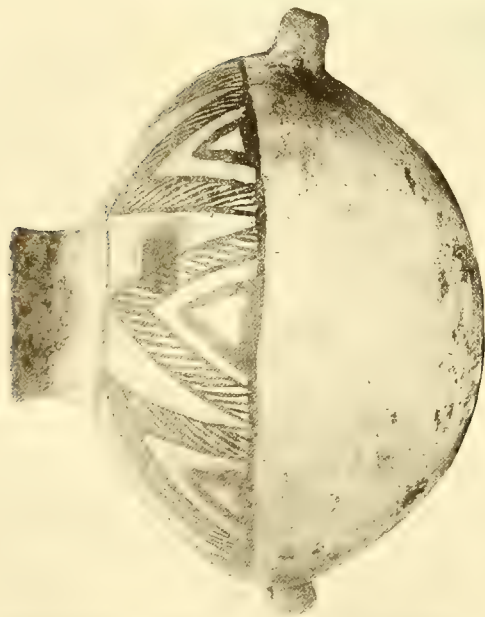


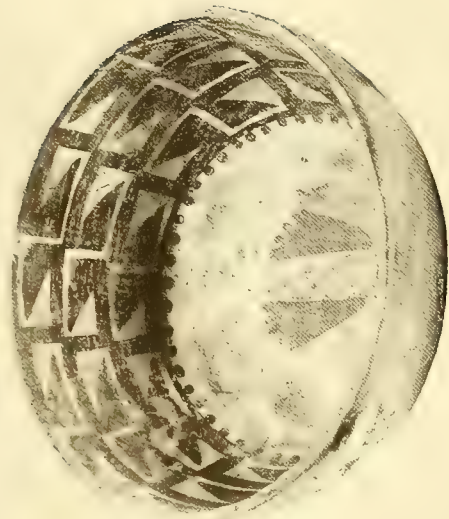
FIG. 9.—Cover of vase from Oak-tree House.

¹ Bull. 51, Bur. Amer. Ethnol., p. 67.



a

HEIGHT $9\frac{1}{2}$ INCHES



b

DIAMETER $7\frac{3}{4}$ INCHES

VESSELS OF BLACK-AND-WHITE WARE FROM OAK-TREE HOUSE

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carried in trays by the *Tataukyamu*, a Hopi priesthood of the New Fire rite, as elsewhere described,¹ and presented to the women with ears of corn. Here as in the kivas they represent the Germ God or the supernatural being of the Underworld who causes the corn to germinate."

OBJECTS OF BONE AND WOOD

The various forms of bone implements from Oak-tree House are shown in figure 10. They do not differ radically from those from the Mesa Verde, already illustrated, but attention had not previously been called to the notches which are common features on one side.

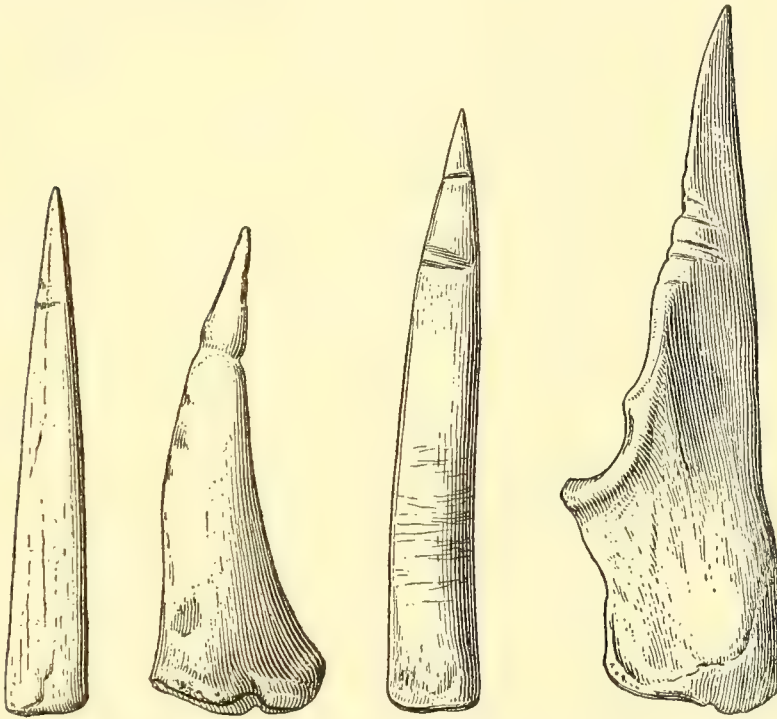


FIG. 10—Bone implements from Oak-tree House.

Several specimens made of wood occur in the collection, among which may be mentioned planting sticks, slabs, prayer-sticks (fig. 11), clubs, handles of axes, and certain problematical objects, not unlike those already figured by Nordenskiöld.

¹ *Journ. Amer. Folk-lore*, vol. v, no. xviii, p. 213.

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SNOW-SHOE

The wooden framework shown in plate IX, *a*, the form of which may be seen at a glance, has been identified as a snow-shoe. It was found in one of the rooms back of Kiva D, a foot below the surface of the débris on the floor. The object appears to be of willow, but was so dry when found that it had lost all flexibility. Evidently the two extremities of the rod of which it is made was tied with leather strings, but these have disappeared. The cross-rods were bent and tied in place with thongs, as indicated in the figure.

Several specimens of so-called snow-shoes have been reported from Mesa Verde ruins, but this is the only one from that locality in the collections of the National Museum.

WOVEN FABRICS

Numerous plaited sandals and particularly good rings, or head-rests for pottery, were found in the débris in one of the rear rooms of Oak-tree House. One of the latter is here shown in plate X from both above and below. Similar specimens have been found in Spruce-tree House and Cliff Palace.

Fragments of cord, cloth, and other textile materials were found in the débris in the rooms. As this refuse had been worked over by previous diggers, the specimens, with one or two exceptions, were fragmentary. One of the instructive objects of this nature was a straw wisp (fig. 12) used as a hair-brush or for other purposes.

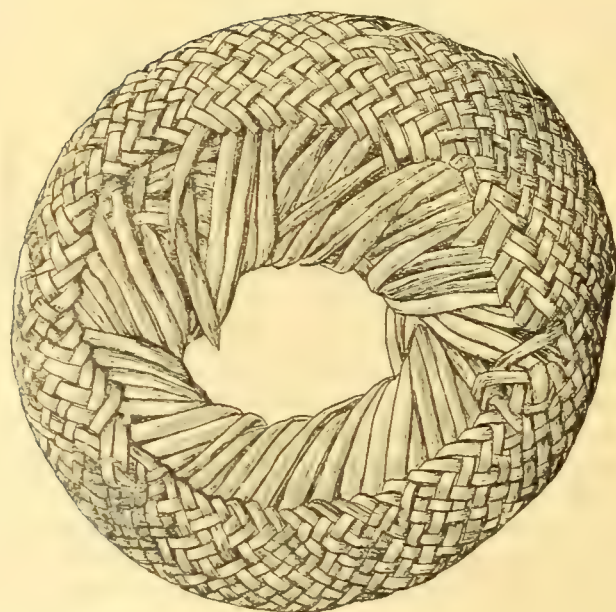
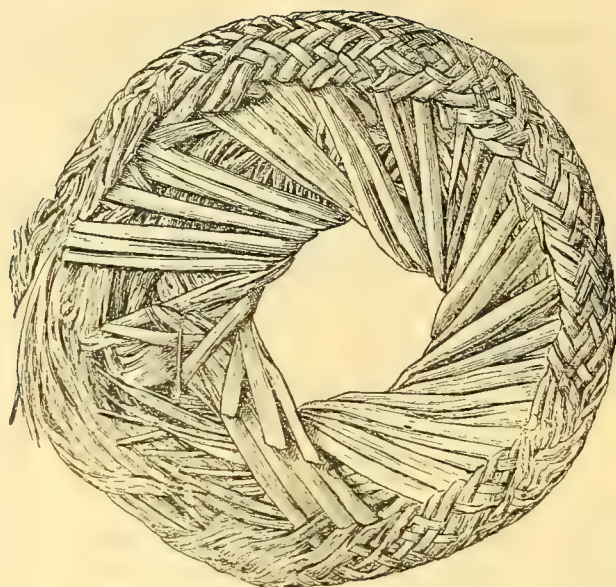
CONCLUSIONS

In this paper stress is laid on the structural features of Oak-tree House, as these are of importance in determining the relation of the culture of its inhabitants. Earthenware objects also afford important testimony, but these are more uniform in the various Mesa Verde ruins.

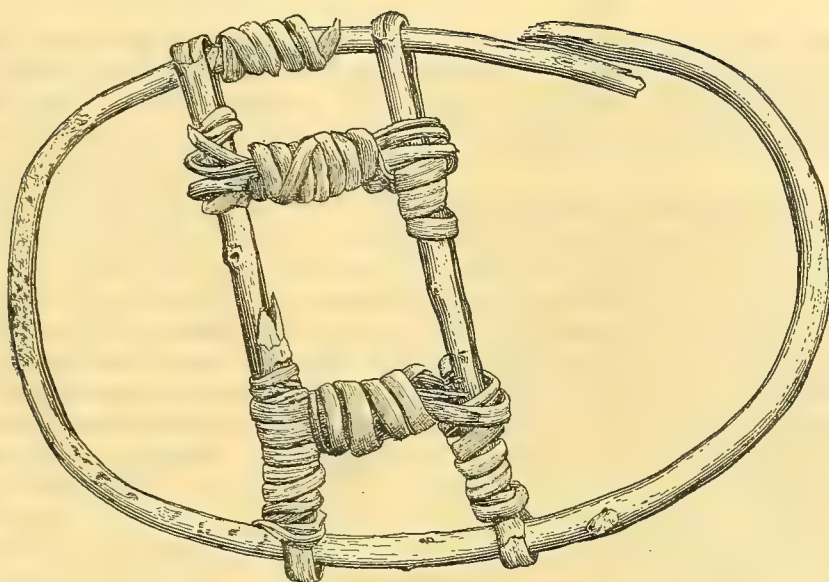
The form of structure of the kivas is more indicative of culture than that of the secular rooms. The two primary types into which kivas are divided are (I) the rectangular and (II) the circular. In Arizona the rectangular type originated from a secular room, but this rarely occurs in Mesa Verde architecture. It is not an early stage of a circular kiva, but has been somewhat modified by that type. The



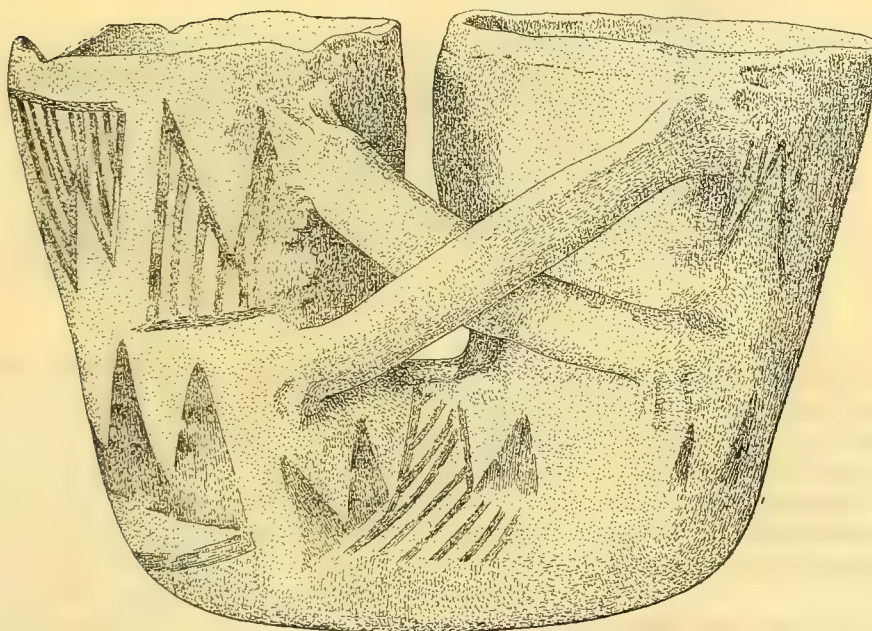
FIG. 11.— Prayer-sticks from the Sun Temple.



UPPER AND LOWER VIEWS OF A HEAD-REST FROM OAK-TREE HOUSE



a. FRAME OF SNOW-SHOE FROM OAK-TREE HOUSE



b. DOUBLE VASE (FROM MESA VERDE?)
ARTIFACTS FROM CLIFF-RUINS

FEWKES—RUINS IN FEWKES CAÑON

circular type, which is represented by many examples in the Mesa Verde, falls naturally into two groups—(*A*) that characterized by a vaulted roof, and (*B*) that in which the roof is flat. The former is known by the presence, the latter by the absence, of pilasters projecting from the inner walls.

These two groups of circular kivas differ in other particulars—one, (*a*) the vaulted-roofed form, is subterranean; the other, or flat-roofed form (*b*), is built above ground. The walls of circular kivas above ground have ordinarily a banquette extending either partly or completely round the room. This form of kiva is sometimes surrounded by a second wall, connected by radial partitions separating the interval into several compartments; it is then called a tower, and may be circular, semicircular, or square. The circular kiva with vaulted roof (*a*) is most highly developed in the Mesa Verde, the McElmo and its tributaries, the Chaco, the Chelly, and westward to Montezuma cañon. As we pass from this area to the westward, however, this type loses its essential structural features and is replaced by the flat-roofed, circular kiva, which extends far down the San Juan to the great ruins of the Navaho National Monument in northern Arizona

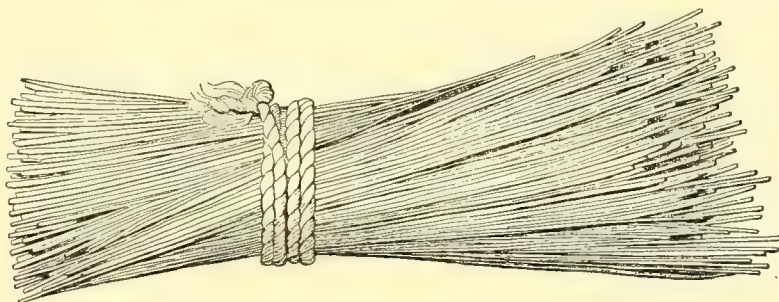


FIG. 12.—Straw brush from Oak-tree House.

The circular kiva above ground (*b*) has a limited distribution, corresponding closely with that of the other type (*a*), and it also becomes less and less complex architecturally as the distance from the Mesa Verde increases. In the tower, its most highly developed form, it has two encircling walls with partitions, separating compartments; in its modified form it has lost these important features. The modern circular kiva belongs to the second type (*b*), but is not so complicated as the tower, being without surrounding rooms.

Architecturally, and hence culturally, round ruins are generally associated, in the Southwest, with round towers, or circular kivas

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above ground, although the geographical distribution of the two is not necessarily the same. Round ruins occur throughout the area from the San Juan or Mesa Verde to Zuñi, but their special characters are most pronounced in the northern area. Although as yet we have not demonstrated the existence of a round ruin on the Mesa Verde or in the San Juan, the indications are that the so-called Mummy lake in the former region is not a reservoir, as its name indicates, but a round pueblo belonging to the same type as Peñasco Blanco in the Chaco cañon, and other circular ruins as far south as Zuñi.

Kintiel and its neighbor, Kinna Zinde, several miles north of Zuñi, and Fire House or Tebungkihu and Kukutcomo near Sikyatki, belong to this circular type. The well-known Tyuonyi and other Keres ruins in the Rio Grande region are circular, while several oval ruins, such as Heshotauthla, Matyata, and others near Zuñi, might be mentioned.

Information derived from a study of the pottery corroborates the teachings afforded by the architectural features of these ruins. The typical Mesa Verde pottery occurs in the same ruins as do the characteristic vaulted-roof kivas. In other words, both indicate one and the same culture from which far-reaching influences have gone out. Clans have conveyed architectural and ceramic features from the San Juan into the Rio Grande region, where the second type of circular flat-roof kivas survives in several modern pueblos. Other clans, migrating westward down the San Juan, have carried the same ceramic and architectural features to Navaho mountain and even to the Hopi country. As the culture is extended farther and farther from its place of origin¹ its influence weakens: the kiva loses many of its early structural characters; the symbols on pottery are modified or replaced by others more complex, due to evolution or contact with alien tribes. Areas of specialized symbolism have developed in this way, westward and southward, and distinct areas with a corresponding variety of symbols have become differentiated; hence we find so many architectural and ceramic local centers southward and westward from the Mesa Verde, where the culture is uniform over a much larger area.

The largest ruins of circular or oval form occur midway in the line from the San Juan to the Zuñi pueblos, and are either smaller or entirely absent in the regions east or west of that line, although instances of their sporadic occurrence elsewhere might be mentioned. The distribution of this characteristic type follows what may be regarded as the route of migration of clans of an ancient people from the

¹ The legends of the Pueblos locate their place of origin in the north, which was the direction of the San Juan from them. The people of San Juan valley are called by the Hopi the Tcamahia, a Keres word for Warriors of the North.

FEWKES—RUINS IN FEWKES CAÑON

San Juan to Zuñi. Although circular pueblos are now extinct, remnants of circular walls appear in outlying inhabited settlements of the Zuñi, such as Nutria and Pescado. These round ruins are commonly attributed to clans belonging to the oldest Pueblo linguistic stock, the Keres.

Migratory colonists, ascribed to like clans, made their way to the East Mesa in Hopi, and brought with them the round type of architecture. On the way there they built a circular pueblo, now a ruin, called Fire House, fifteen miles east of Keam's cañon, and a round structure called Kukutcomo, three miles from Walpi, near Sikyatki, which legends ascribe probably to a Keres people, or at any rate to Fire clans from near Jemez.

BUREAU OF AMERICAN ETHNOLOGY
WASHINGTON, D.C.

A Birthday Wish from Native America

By ALICE C. FLETCHER



THROUGHOUT the region drained by the Mississippi river, a ceremony was once practised that had for its purpose the establishment of peaceful relations between groups of unrelated people. Remains of its paraphernalia found in the caves of Kentucky, in old burial sites, bear witness that for generations before the coming of the white race this rite was honored by tribes of different linguistic stocks. Both Spanish and French travelers make mention of it, as did some of the missionaries. Among the latter the account given by Marquette has a special interest, not only for the description he gives of the ceremony itself, but by reason of the statement that he carried with him, as a gift from a friendly tribe, the peculiarly decorated pipe belonging to this rite and that the respect shown this sacred object by the various tribes he met enabled him to pursue in safety his epoch-making voyage down the Mississippi in 1672.

Although Marquette published this striking illustration of the widespread influence of a native rite, no interest was aroused or effort made to secure any definite knowledge of so remarkable a ceremony. It was occasionally mentioned, under different names, by travelers during the two centuries following, but its true significance seems to have lain hidden from casual observers.

About thirty-five years ago the writer had the good fortune to witness this ceremony, to discern something of its beauty, and to enter on a persistent effort to learn about it. This was finally successful, whereby was secured all the songs and rituals, and a full explanation of the details of the rite as practised by the Pawnee tribe.¹

A comparative study of the ceremony as performed by different tribes has brought to light minor variations that are of historical interest, as they evidently had been brought about by changes in environment. For example, the tribes living in the buffalo country used for the symbolic fat, required in a certain part of the ceremony, that taken from the buffalo rather than from the deer, as the bison was more essential to the welfare of those people.

The rite is evidently old, yet it seems to rest on foundations still more ancient, based on the Indian conception of Nature. This conception, briefly stated, regards Nature as a unit, animated in all its

¹ See *The Hako, Twenty-second Report Bureau of American Ethnology*, pt. 2, 1903.

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parts by an unseen, living power, and is like to a great family of which man is a member.

The belief that Nature is a great family is fundamental to this ceremony. The complex sacred objects used in the rite represent day and night, the heavens with its sun and stars, the earth with its land and water; all these are symbolically present and in sympathy with the underlying and probably the earliest purport of the ceremony, namely, the natural desire for children that the life of the people may be continuous. Under the influence of the idea of Nature as set forth in the ceremony, a development seems to have come about in the purpose of the rite that gave to it a wider outlook and led it into a broader channel of feeling, so that it became a means by which to extend the peaceful tie of the family beyond the merely natural limits, and to draw together two groups of persons having no common kinship, into the semblance of a family relation.

The ceremony required the presence of two wholly unrelated groups of people. One group was called "the fathers" and was composed of the kindred of the man who took the initiative in organizing the party, of twenty or more, and who was termed "the father". These persons generally belonged to the well-to-do class, as the requirements for the ceremony were such that only skilful hunters and thrifty households could supply the needed articles. The second group, called "the children", was made up of the relatives of the man chosen by "the father" to receive the visiting party and who was known as "the son". "The father" and "the son" had to be of equal standing in their respective tribes. "The father" selected a man, versed in the rite, who knew all the songs, the ritualistic movements, and manifold details of the ceremony, and he became the priestly leader, to whom the entire company must yield absolute obedience.

The honor accorded those men who assumed the responsible positions of "father" and "son" was of so high a character that the labor involved in the accumulation of the articles demanded for the ceremony was willingly undertaken, as the honor not only bestowed tribal distinction on these men and their associates, but it brought to them the promise of peace, of prosperity, and of future happiness.

This ceremony was always distinct from tribal rites, from vocations of the people, from gatherings of religious or secular societies, and in no way did it conflict with them. An old priest of the rite, speaking of the time when it could be performed, said: "We take up the sacred emblems [ceremonial objects] in the spring, when the birds are mating; in the summer, when the birds are nesting and caring for their young; in the autumn, when the birds are flocking; but, never

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in winter, when all things are asleep. In this ceremony we are praying for the gift of life, of strength, of plenty, and of peace, so we must pray when life everywhere is stirring." In his words an echo is heard of the vital belief as to Nature.

Music holds an important place in this ceremony, so much so that in some tribes it is called "To sing with". Each tribe used songs of its own composition when performing the ceremony. The Pawnee version has nearly a hundred. The songs that belong to this ceremony, composed by different tribes, are among the more melodious of the many hundreds of Indian songs, various in their character, that have been gathered by the writer. To the Indian, words do not seem to be essential to the purpose of a song, therefore they may be many, few, or altogether absent. Talking with an old Indian about this peculiarity, he made the following wise remark: "Words talk to us, but harmonious sounds unite the people."

The use of the songs belonging to this ceremony differs in one respect from the use of those that pertain to tribal rites, to societies of one kind and another, in that they are not held as the exclusive property of a clan or a group and forbidden to be used by others; on the contrary, they are declared to be "free to all". Consequently, among the tribes familiar with the ceremony, its songs are sung by old and young. Many are choral in form, communal in feeling, pleasing in rhythm and in melody. The writer has several times heard one or two hundred men, women, and children joining heartily in these chorals that voice an appeal for peace and happiness.

The teachings in that portion of the ceremony which was open to the public were general in character: they emphasized man's dependence on the unseen living power that animates all Nature, a power that was called by different names in the various tribes, but recognized by all as the source of the gifts of life; they also set forth man's reliance on the family tie for the gifts of peace and happiness. The teachings in the secret portion of the ceremony were reserved for "the son"; these dealt with the extension of the bond of the family relation beyond that of blood kinship through symbolic acts that recognized the permeating living power within Nature as that which brings all forms into being.

Space forbids more than these general statements regarding this thoughtful, humane, native rite, which is elaborate, extended, and noteworthy in structure. It stands like a lofty edifice, strong in outline, compactly built, yet ornamented with details full of color, replete with symbolism; within are enshrined noble, poetic thoughts embodied in action, rhythmic movement, and song.

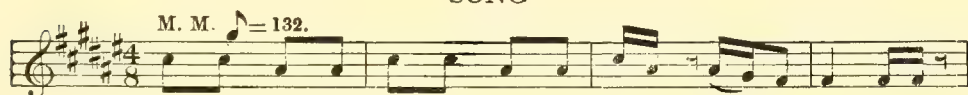
FLETCHER—A BIRTHDAY WISH

In the past life in our land, this ceremony has played an important part and exercised a far-reaching influence. On the material side it caused commodities to be exchanged, whereby the handicraft of one region was made known to other sections. On the immaterial side, the thoughts of the native seers expressed in the rite bore forward the mind of the people toward a conception that closely approached that of the brotherhood of man, a conception recognized as among the noblest known to the human family.

In 1884 the British Association for the Advancement of Science and the American Association for the Advancement of Science met at Philadelphia. On that occasion the writer carried the sacred objects belonging to this ceremony on what was probably their longest journey, in order that, for the first time, the songs of the rite might bear their message of peace and good-will across the line of race, and, through the human spirit of the ceremony of which they were a part, bring together the peoples of the old and of the new America.

Once more the spirit of this ancient ceremony is evoked! The following hitherto unpublished song from the Oto version of the rite is here presented in its native guise, that it may convey to him, whom we honor and who is gifted to discern beauty under a strange exterior, the wish, which is the burden of the song, that to him may be granted the perennial happiness that knows not years, being ever the companion of immortal youth.

SONG



Noⁿ - we shka-dse, noⁿ - we shka-dse; Ha-ha! e he tha, Ha-ha!



we Ha-ha! e he tha, Ha-ha! e Ha-ha! e he tha tha. Hoⁿ-ga!



Noⁿ - we shka-dse, noⁿ-we shka-dse; Ha-ha, e he tha.

Noⁿ-we shka-dse, noⁿ-we shka-dse;
 Ha-ha! e he tha, Ha-ha! we Ha-ha! e he tha,
 Ha-ha! e he tha tha. Hoⁿ-ga!
 Noⁿ-we shka-dse, noⁿ-we shka-dse;
 Ha-ha! e he tha.

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There is but one stanza and three words to this song. The first and fourth lines repeat two of the words: *noⁿ-we*, a pathway (typifying life's onward movement), and *shka-dse*, play. The third word, *hoⁿ-ga*, occurs at the end of the third line and gives the key to the meaning of the song. *Hoⁿ-ga* is a ceremonial term applied to the child, upon whom, during the secret portion of the ceremony, are placed the symbols of life, of strength, of plenty, of the continuity of all that makes for happiness and peace. Laughing vocables, indicative of care-free joy, fill the rest of the musical measures.

The little Song makes the picture of a bright pathway, free from danger or trouble, where play the children filled with the potentialities of Happiness.

WASHINGTON, D.C.

The Influence of Geology on Human Development

By GERARD FOWKE



FOR primitive man shelter was as necessary as food. His natural home was near the rivers and seas, in the mountains and forests. In the proper season he could conduct extensive hunts on the plains, but in winter he must return to rough or timbered country where he might find protection from inclement weather. Where caves existed, they were utilized; where there was no such natural refuge, an artificial one had to be provided. This at first was of brush and leaves, later of bark, finally of timber.

This necessity constrained him until he had learned the art of preparing the hides of animals in a way that would render them sufficiently durable and resistant to be made into tents. In the eastern hemisphere he next learned how to domesticate a few of the animals around him, and thus becoming to some extent independent of natural resources, he no longer feared to move out into the natural meadows.

Presently he discovered how to convert raw ore into iron, and became a farmer; and when he could bring into use other minerals, as clay and stone, he became manufacturer and trader.

This process of development was governed and directed throughout by the geology of the regions in which man found himself placed, or into which he moved of his own volition. On the coasts and along the rivers his brain had no higher stimulus and his hands no better occupation than the invention and completion of contrivances for capturing the fish and other sea products upon which he subsisted; while in his home life his ingenuity had no higher play than in the procurement of the few objects that were required for clothing, or in the preparation of the food which he ate in the crevices and holes where he found a retreat from cold and darkness.

In those lands where the upheaval of the earth's crust has formed mountain ranges bordering on or surrounded by rugged and broken country, or where the character of the soil, which depends on geological structure, favors the growth of extensive forests, the manner of living is of necessity very different. All animate nature is in a state of

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perpetual warfare. There is incessant strife of wits on the part of flesh-eating animals to capture their prey, and on the part of the intended victim to circumvent the craft and acuteness of his wily pursuer. Swiftmess of foot, keenness of vision, quick intelligence to perceive the slightest point of advantage in either flight or pursuit: these are the essentials which all animals must possess in order to approach their limit of age. With failing power comes instant doom: comparatively few wild animals, except the largest, die a natural death.

When man came upon the scene amid such surroundings, he came as a part of the life already existing, and had to take his chances. Physically, the chances were against him; for of all creatures man entirely unprovided with artificial aids is the most helpless. Most animals could escape from him by flight, or hide where he could not discover them; some could overcome him in combat; a few took delight in feasting on him. His intelligence was not superior, perhaps not equal, to that of the fox or the wolf.

But he had one inestimable advantage. He had hands with flexible fingers and an opposable thumb; so that when he had mastered the idea of a trap or a weapon, he could construct it. This ability made him at once the superior of the other animals. But as these, in course of time, would learn to avoid his traps and to ascertain the distance at which they would be safe from his weapons, man must continually exercise his brain to devise new methods of enticing them to his snares or of enabling him to come within range of them. Under the urging of such necessity, his mental power increased. As game grew suspicious, he must become more alert. As he weeded out the slower or weaker animals, he must gain in strength and endurance to pursue those which would not come within his reach. Long vigils at the side of a spring or a trail cultivated in him habits of patience and fortitude. The necessity not only of providing for his family and dependents, but of protecting them from surrounding dangers against which they could not defend themselves, made him more daring, more resolute, more determined not to be overcome and not to cease striving until he had attained the end which he had in view.

The man who lives among rocky cliffs or on barren heights, or along the wind-swept littoral, where vegetation is scant, where animals are small and few in number, whose food is brought almost to his door by waves and currents, naturally develops into a very different kind of being from the one whose range of activity carries him far into gloomy forests or among towering mountains where each day brings unforeseen and unexpected experiences. Geological structure determines the life of both.

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Quite different from either is the man whom nature has assigned to treeless, grass-covered plains, where his sole reliance for existence is his flocks and herds. The only energy and foresight required in their care is to drive them from pasture to pasture as grass becomes exhausted, or to prevent them from straying out of reach of recovery. In this kind of life man soon becomes, in effect, "a brother of the ox."

Men living in settled communities are less affected by their environment. They modify the surface to suit their requirements. They delve into the ground and bring out substances which were unrevealed to primitive man, and with these they build up a civilization.

Until man is entering this last stage, he is concerned only with the superficial aspect of geology—that branch of it which we commonly know as Physical Geography. In the childhood of the race it was the only portion which bore any relation to human life. It is inevitable that the distribution of land and water; the trend of ocean currents; the direction and force of the prevailing winds; the character of soils, which result from decay of the underlying rocks; the height and bearing of mountain ranges; the inequalities of land, whether flat plains, rugged mountains, or rolling hills; the course of rivers; the amount and quality of water supply—it is inevitable that these features should exert a very great influence on the character and disposition of individuals and nations. The dwellers near stormy seas people the air and heavens with mighty gods whose deeds are those of valor and strength and wrath; the mountaineer frequently reflects in his soul the hard, sterile aspect of the peaks; the imagination of the desert wanderer absorbs something of the marvelous coloring of his sky; amid beautiful scenery is born the poetic and artistic instinct.

In considering, however, the influence of soil, climate, and topography on the evolution of a race which lives long in any part of the earth, it must be remembered that a very long period of time is required to develop fully their racial characteristics. Similarly it takes a long time to alter them once they become fixed. So when we attempt to trace a connection between the temperament or the beliefs of a community and the nature of the country in which it is established, we must take into consideration the mental qualities which have had their beginnings in some other part of the world. This is particularly observable where large numbers of persons have moved in a body from one country to another and formed a colony that has little in common with the community in which it has settled, or, even more, has displaced a clan or a tribe and occupied its territory. Yet, in time, the intruding colony loses much of its original

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endowment of disposition and character, and falls into ways more consonant with its new surroundings. Many historical instances could be cited to show that, given time enough, transplanted races will lose the characteristics which distinguished them in their original home, and take on those which properly belong to the places in which they settle. Where there is a mingling instead of a segregation, the most that the alien race can do to affect the native race with which it assimilates is to bring in some religious idea or economic principle which may fit in with the customs and beliefs belonging to the country, and thus bring about a modification of the older ideas.

A few examples may be cited to show the influence of environment on national character, as well as on manner of living.

In ages past pastoral people roved at will over the vast plains of western and central Asia, recognizing no authority but that of their patriarchs who by virtue of their age and consequent experience were supposed to be wiser than the others. Even this slight authority was exercised mainly in the way of advice or instruction. Neither did these people recognize any limitations of territory; they went where they pleased, according to their needs. In this way was developed the wandering instinct and the independence of action which led these old Aryans to spread over much of the eastern hemisphere. When at last compelled by increasing numbers to break up in bands which made their way into far countries, we find them adapting their industries and their habits, their beliefs and their ideas, to the conditions in which they found themselves.

It is not necessary to follow this theme; the governments and religions of Hindustan, of the plateaus and plains of western Asia, and Egypt, grew in accordance with the conditions amid which they were conceived. The beauties of sea and land created and fostered and brought to perfection the artistic faculties of the Greeks and the Italians.

The early Scandinavians were the great sea-faring people because the innumerable bays and fiords of their coast offered secure harbors; and the old Vikings surpassed all other men for hardihood and boldness of adventure. Their spirit was strengthened by unending conflict with waves and storms, to which they were driven by their insufficient soil. Then, the Swedes, Danes, and Norwegians were practically one people, mingling with one another as if in one territory; now they are no longer the same. Moreover, portions of Scotland, Ireland, and southern England were settled largely by the old Norse freebooters, as was Normandy in France. Yet those living in these areas are developing into distinct types, and in time only the historian will know

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that they were once homogeneous. And it is to the persistence of spirit so deeply implanted in the old Norse that England owes her great explorers and pioneers. The Saxon or German is justly entitled to precedence as a colonizer and developer of new regions; but he is never a pioneer, moving in only when some one else has opened the way. He has always been a farmer and trader, and to some extent a settler in cultivated territories; but he has not been partial to the wilderness. The progress of civilization owes as much to the rugged coast and rocky soil of Scandinavia as it does to the level lands along the Baltic sea or the rolling fields of southern England.

Even the general outward appearance of men depends on geology to some extent. The physical structure of the mountaineer is not like that of the man who lives on dry, level land, and both are different from the dweller in the swamp. People who belong to limestone soils are heavier, though not always taller, than those living in sandstone regions. There is no reason for believing that the inhabitants of the United States, as a whole, will develop into distinct types, such as now exist in Europe, owing to the facilities for intermingling; but it is a fact that where the manner of living of the people approximates most closely to that led by the aborigines, the white man is taking on something of the Indian expression and attributes.

Dependent also on soil and climate, which are determined by geological structure, are the products of the earth on which men must subsist; and the amount and quality of food is a decisive factor in the formation of character. Despite the popular superstition that fish is a brain food, it is beyond doubt that those who are compelled to live principally on fish are intellectually feeble. Those who subsist entirely or even chiefly on meat are usually vigorous, cruel, overbearing, adventurous, seldom attached to their homes, ever ready to rove and wander, prone to make incursions and to despoil those living outside their boundaries—not so much on account of the meat diet, perhaps, but because of the influence on their minds of the methods by which they must secure it.

So long as man's needs were satisfied with natural productions, savagery prevailed. Permanent communities were not established until spontaneous products of the earth no longer sufficed for the sustenance of a constantly increasing population, and agriculture had consequently to be taken up as a business instead of a makeshift. Even then the founders of such communities were forced into situations which were not suitable for the requirements of hunters or cattle-raisers—to the lands of insufficient rainfall and scanty vegetation. The great centers of earliest systematic culture were in localities

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where irrigation was necessary. The civilian unable to overcome the savage must keep out of his reach.

The general considerations set forth above are applicable to all people, at all times, in all parts of the world. The North American Indian is to be regarded in the same light as any other primitive man. The Eskimo may be omitted from discussion, because he could not have lived otherwise than he did in the bleak region where cultivation of the soil was impossible. So may the ancient Mexican, for we know nothing about him.

Except in the extreme west, from the Columbia river northward, the Indian of the United States and Canada was not a fisherman in the sense that he depended principally or even largely on fish for his subsistence. He was a successful fisherman, it is true, when he lived near water, but his main reliance was on game and natural productions except in small and scattered areas where temporary settlements were formed. These were along streams for the greater part, where alluvial tracts yielded good returns for his crude labor. Over nearly all the eastern half of the continent interminable forests sheltered an abundance of beasts and birds which he snared and hunted. While in Asia, horses, cattle, sheep, and goats were domesticated before the beginning of recorded history, while even the Laplander of the frozen north of Europe had teams of reindeer and the Peruvians made use of the llama and alpaca, the Indian of North America had no animal which he ever succeeded in taming, beyond a few fowls in the South and Southwest, and the wolf which he converted into a sort of dog. Until the coming of the white man there was not an animal, excepting the dog, of which he could make use in any occupation, or which, excepting the turkey, he could keep in flocks or herds; consequently, he could not become a stockman, as were those in a similar stage of development in Asia. Being unacquainted with iron, he was restricted in his employment to those industries in which he could do all his work with fire or stone. With arduous labor and infinite patience he could fell trees and remove brush; and in this way cleared small tracts on which he raised various grains and vegetables.

But his main food was flesh; and this must be had from the forests. The animals which he hunted soon learned to avoid his settlements, to retreat deeper into the woodland. He found, in time, that other men were hunting over the same ground. As there was not enough for all, one hunter must seek new fields or perish in conflict. Thus arose the savage, bloodthirsty spirit, the aptitude for warfare, which we, somehow, always think of as the Indian's principal characteristic.

FOWKE—INFLUENCE OF GEOLOGY

As families increased in numbers, and united, and grew into clans, the hunting life, unsupplemented, was no longer possible. The amount of game was not sufficient to provide them with food, and agriculture became a necessity.

But it was only in exceptional situations that agriculture could be expanded into proportions beyond the extent demanded for the requirements of a village or small town. All work had to be done by hand with crude implements. There being no plows, the soil must be prepared with sticks tipped with stone or bone. As there were no iron tools for cultivating crops, only a limited amount of produce could be cultivated by one person, no matter at what expenditure of labor. The men were still compelled to go in search of game, and to constantly increasing distances as they remained for years in any given locality. They had no time to cultivate crops, so this toil fell to the women. The farther afield the men carried their excursions, the greater was the certainty of coming in contact with men from other settlements, with whom they must fight. Injuries to either side led to reprisals; and in this way were engendered animosities that led to perpetual enmities and unceasing conflict. Disdaining to work at raising crops, which they had come to consider as woman's work, the men in the intervals when game was not in season turned their attention to the pursuit of enemies. In the vast forests every man was a foe who could not prove himself a friend. Thus was kept alive and fanned into greater activity the instinct to destroy, which had its origin in the killing of animals, until the warrior's greatest claim to glory was the number of scalps he had taken. He must exceed in shrewdness, skill, and endurance the men and the animals which he had to slay in order to live. He was free, independent, untrammelled, subject to no law but his own will or the force of circumstances, and the natural foe of every man who did not belong to his own clan.

The Indian of the central United States was the equal if not the superior, intellectually and physically, of any race that ever existed in a like stage of culture. In situations where natural advantages were somewhat in his favor, he showed what he was capable of accomplishing. The tribal organizations of the Five Nations compares favorably with the beginning of the Roman empire. The great works of the Aztec, Maya, and Natchez, of the builders of the Cahokia group of mounds, of the Ohio mound-builders; the settled life of the Creeks, Cherokees, and others, in addition to those just mentioned; the political combinations effected by Tecumseh and Pontiac; the masterful retreat of Chief Joseph through the tortuous defiles of the Rocky mountains, a feat as worthy of a great epic as the escape of the Ten

HOLMES ANNIVERSARY VOLUME

Thousand in Asia Minor—all these show what the Indian could have accomplished had the conditions of existence been different. If he had been of an inventive or mechanical turn of mind, he would have built up in this country a great nation.

But his adverse surroundings were too great for him to overcome. He was compelled to depend on wild game for his meat. Unable to make any impression on the great forests, which would grow faster than he could clear them away, he must, as a rule, exist in small communities. He must have around him a large expanse of wilderness to insure a supply of game; consequently he must have no neighbors. With only stone for making implements or weapons, he must exert the maximum of effort to secure the minimum of result. Throughout his life he was the target for disease, warfare, cold, scarcity of food, all of which taxed his vitality to the utmost.

Without domestic animals which can be bred in sufficient numbers to meet all demands for food and for labor; without knowledge of working in iron to the extent that it can be manufactured into all needed tools, implements, and utensils; without sedentary communities in which there can be a division of labor such that each man can put all his energies into that for which he is best fitted; and without a system of transportation by which separated communities can exchange their surplus products: without these aids no people can ever pass very far beyond the dividing line between savagery and barbarism. By reason of his geological environment the Indian could not overcome these handicaps.

Restricted as he was to indifferent materials, the Indian yet accomplished much with the little he had. Along the coasts and the rivers, with his spears and nets he became an expert fisherman. In the islands of Alaska and British Columbia he made canoes as seaworthy as the products of our best boat-yards. In Michigan he mined copper and wrought it into all manner of useful and ornamental shapes. In northern United States and southern Canada he displayed no mean degree of artistic and mechanical skill in the fabrication of axes and tomahawks from granite, syenite, and diorite, as well as in the shaping of ornaments and symbols from slate and harder stone. Wherever the vast flint deposits in the lower Carboniferous strata of the Mississippi valley were at all accessible to him, he quarried extensively and converted the intractable stone into myriad patterns of knives, arrowpoints, and spearheads, many of them having beautiful outlines and delicate finish. With only sharpened bones for needles, he made garments not only serviceable but neat-fitting and often very handsome. In southern Illinois he made of chert nodules ex-

FOWKE—INFLUENCE OF GEOLOGY

cellent agricultural implements. In Missouri and Arkansas, and also in Arizona and New Mexico, he utilized suitable clay for the manufacture of artistic pottery. In the Pueblo region, where wood was scarce, he constructed substantial houses of adobe clay. In all these places he did all that is possible for man to do when deprived of iron and of animals for draft or burden; and so his geological surroundings made him what he was.

CINCINNATI, OHIO

The Masked Dancers of the Apache

By P. E. GODDARD



THE masked dancers are one of the outstanding features of the ceremonial and religious life of the Southwest. They are a logical and almost necessary adjunct to any serious attempt at dramatization by a people who are accustomed to think and to represent feelings and concepts by means of symbols. That the dramas in which these figures appear represent past history or tradition is not the only view to be taken of them, nor the one indeed most consistent with Indian thought and with ascertained general ethnological facts. Among the Hopi and Navaho the masked figures represent the contemporaneous existing gods and other supernatural beings who come to mingle with men to share in their joys and in the labor of producing health and prosperity. To the uninitiated children, and in some cases to the women also, these masked men are the actual gods. That to the initiated they vicariously represent the gods is certain, and that they are for the time being endowed with the supernatural nature and power of the beings so represented is probable.

The Apache of Arizona and the Mescalero of New Mexico call these masked dancers *Gan*, in Mescalero *Gāhi*, and the beings they represent by the same name. Certain individuals in each locality are in charge of the cult. These men must know perfectly a great many songs, at least fifty, and also remember the order in which they should occur. They must also know how to prepare the masks and have the skill to make them, and they must be able to so superintend the ceremony that an impressive and interesting spectacle results. It is perfectly evident that such detailed knowledge can be attained only by long and patient study under the guidance of some learned teacher. That this is the course followed is easily ascertained. A son or other relative of a younger generation assists the elder, and gradually acquires the necessary knowledge. While this is the actual practice, in theory each novice must receive his qualifications directly from the supernatural beings in one or more visitations. Thereafter these men are en rapport with the *Gans*, who assist them in many ways but whose power is greatly feared in case of any transgressions of established practices.

Among the Mescalero it was with the greatest difficulty that any

GODDARD—APACHE MASKED DANCERS

first-hand information could be secured from the men who were in charge of the Gāhi, as they call them. One man gave a brief narrative of the origin of the cult. A blind man and a crippled one, having been deserted, the former took the latter on his back and carried him along the side of a perpendicular cliff which at one point yielded to pressure. In the interior they found a paradise where their infirmities were removed by a ceremony conducted by the Gāhi, who also imparted the rites which were taken back by the rejuvenated men to mortals. The Gāhi are believed to be still living in the interior of certain mountains. A second man was old and his mind more or less unbalanced, but his mania was so closely connected with his religion that there was much doubt as to which was the cause and which was the effect. The man had met the Gāhi while passing one of their mountain homes. They constantly visited him, furnishing him knowledge of hidden events. By their aid he claimed to have made an aerial journey to Washington. While no dependence could be placed on information consciously imparted by him he was able to sing in the phonograph songs the words of which were later transcribed. By the same method songs were secured from a White Mountain Apache informant. Since without doubt these songs are the most trustworthy sources of information as to the essentials of these cults, a few examples of those obtained in Arizona will be given in translation.

I

When the earth was made;
When the sky was made;
When my songs were first heard;
The holy mountain was standing toward me with life.

At the center of the sky, the holy boy walks four ways with life.
Just mine, my mountain became; standing toward me with life.
Gan children became; standing toward me with life.
When the sun goes down to the earth, where Mescal mountain lies
with its head toward the sunrise,
Black spruce became; standing up with me.

II

Right at the center of the sky the holy boy with life walks in four
directions.
Lightning with life in four colors comes down four times.
The place which is called black spot with life;
The place which is called blue spot with life;
The place which is called yellow spot with life;
The place which is called white spot with life;
They have heard about me,
The black Gans dance in four places.
The sun starts down toward the earth.

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III

The living sky black-spotted;
The living sky blue-spotted;
The living sky yellow-spotted;
The living sky white-spotted;
The young spruce as girls stood up for their dance in the way of life.
When my songs first were, they made my songs with words of jet.
Earth when it was made,
Sky when it was made,
Earth to the end,
Sky to the end.
Black Gan, black thunder, when they came toward each other,
The various bad things that used to be vanished;
The bad wishes which were in the world vanished.
The lightning of black thunder struck four times for them.
It struck four times for me.

IV

When first my songs became,
When the sky was made,
When the earth was made,
The breath of the Gans on me made only of down,
When they heard about my life;
Where they got their life;
When they heard about me;
It stands.

Earth was holy,
Sky was made,
Earth was made,
The center of the sky
Mirage in four colors.
The Gan young people lighted on the sky four times.
Their lives, four directions they heard about me.
With pollen speech,
With my mouth speech,
It moves within me.
The holy Gans were in line four times with me.

V

The day broke with slender rain.
The place which is called "lightning's water stands",
The place which is called "where the dawn strikes",
Four places where it is called "it dawns with life",
I land there.
The sky boys, I go among them.
He came to me with long life.

GODDARD—APACHE MASKED DANCERS

When he talked over my body with the longest life,
The voice of thunder spoke well four times.
He spoke four times to me with life.
Holy sky boy spoke to me four times.
When he talked to me my breath became.

In these songs one recognizes at once the sacred number four, connected with the world-quarters, each with its color. The east is black, the south is blue, the west is yellow, and the north is white. The dualism of sky and earth also appears. Several of the sacred materials are mentioned—the soft feathers, the black stone or jet, and pollen connected with speech or prayer. The mountain of the east, "Mescal mountain", is the mythical home of the Gans where there stands a row of Douglas spruce.¹ Besides the Gans themselves, the sky boy and sky girl are prominent as persons, and the thunder and lightning with clouds disguised as spots represent the forces of nature.

During a visit to the Arizona Apache in 1914, by good fortune it was possible to witness a performance of the Gan dance. This was given on the occasion of an abbreviated puberty ceremony for a girl. A dance-ground had been prepared during the day by completely clearing away all brush and other growth and anything which might interfere with the feet of the dancers. A bountiful supply of firewood had been provided and placed in the center of the ground. At the western side a number of singers grouped themselves about the drum, a piece of rawhide stretched over brush. Many families had come during the morning before for the other features of the ceremony. These family groups were scattered on the gently rising hillside to the west with improvised shelters at the back, while in front of them their small cooking fires dotted the hillside as night approached. The young people, the girls and boys in separate lines, began dancing to the music of the drum. With the girls was the one for whom the ceremony was being held.

Soon after sunset the masked dancers appeared in single-file approaching from the east. They circled the dance-ground clockwise and then began dancing. They wore kilts and high moccasins similar to those generally worn by the women. Their bodies were blackened and soon gleamed as violent perspiration was induced by dancing. Over their faces they had canvas masks which were surmounted by the characteristic wooden frames. The material for these frames is split from the flowering stalk of the Spanish bayonet. The pieces are shaved thin and smooth, and cut and painted with the symbolism of

¹ During a recent visit to Arizona this mountain was found to be one of the White Mountain summits, that one called "Baldy".

HOLMES ANNIVERSARY VOLUME

the cult. These carved and painted headdresses are the main objects connected with these rites, and they are looked upon with some reverence and guarded with care. When a dancer is seen in profile, the headdress is scarcely visible because of its thinness, but when the head is suddenly rotated it flashes into full view. Each dancer carries a pair of wands with which he gestures.

The figures of the dance are originated by the leader who has an especially elaborate head-gear and who represents the most important of the Gans, the one of the east. He is sometimes called the Black Gan from the color associated with the east, the Great Gan, or the Talking Gan (Ganowûn). There are usually four masked dancers and a clown. The latter attracts a great deal of attention and causes much delight by exaggerated mistakes in dancing and his general asinine conduct. After dancing for fifteen or twenty minutes, during which the fire is gradually circled clockwise four times, the dancers retire to appear at half-hour intervals. This is supposed to continue throughout the night and to be repeated four nights.

During this time the songs of Naiyenesgani and Estannadlehi are being sung near by, to the accompaniment of which the girl dances by herself or with one companion.¹ This particular celebration was curtailed, the dancing of the Gans ceasing about 1 A.M., and the ceremony as a whole lasting but little more than twenty-four hours instead of the traditional four days. But on this occasion the Gans joined in the morning ceremony in the bright sunlight at 8 A.M. to the very great surprise and delight of the spectators. Because of this quite unusual daylight visitation those present filed by and sprinkled the masked men with pollen, paying them the honor due the gods they represented.

The general import is unmistakable; the mortal friends and relatives of the girl congregate to celebrate her entry upon womanhood. They sing songs and pray for her future welfare and happiness. They make merry and feast in this ceremony, which is partly religious and partly social. With these human friends join the immortals who not only add their contributions to the fortune-bringing rites, but join in the social pleasures of the occasion. The children believe them to be gods; the elders believe that formerly the gods actually came; they all undoubtedly believe that to a considerable extent these masked men are temporarily divine.

AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK CITY

¹ For a brief account of this portion of the ceremony as conducted by the Mescalero, and examples of the songs sung, see "Gotal—A Mescalero Apache Ceremony", *The Putnam Anniversary Volume*, pp. 385-394.



ALABASTER VASE FROM HONDURAS

A Contribution to the Archeology of Middle America

By GEORGE BYRON GORDON



URING a series of explorations which I made in 1894 and again in 1896-97 in the valley of the Ulua river in Honduras, I had the good fortune to discover a number of remarkable sites that yielded rich archeological treasures and proved that in ancient times the broad plain of Sula was the seat of a well-developed native civilization. My full report on these discoveries, published by the Peabody Museum of Harvard University, furnished abundant evidence of a strongly marked local culture with distinguishing characteristics that flourished in close contact with neighboring peoples of distinct cultures and in communication with several more remote peoples in different parts of America.

These points of contact between the ancient dwellers in the Ulua valley and other centers of native American civilization left their marks in the form of numerous importations. The collection found during the excavations of 1896-97 includes objects in stone and in pottery that had their origin in parts as far distant as the Valley of Mexico on the one hand and Panama on the other.

A people who were so enterprising as to establish these various lines of communication and develop this far-reaching foreign trade would not have been slow to benefit by the contact with foreign ideas which that trade brought them, and their progress would not have failed to be accelerated in consequence of their traffic.

It is not surprising therefore to find that the purely local products exhibit on the one hand a strong conservatism and on the other a degree of skill in their workmanship and an artistic merit that was not surpassed among any of the ancient civilized peoples of America.

This Ulua culture, like other ancient American cultures, is without date. That it was contemporary with the ancient Maya empire as well as with various cultivated peoples that flourished in Mexico, Costa Rica, and Panama, is proved by the products of these civilizations, unearched at great depth below the surface in the banks of the Ulua; but until a sure method is found for determining the periods in the history of these better-known peoples, such associations will not aid us in establishing the dates of corresponding periods in the Ulua valley.

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Among the objects unearthed during the excavations in the banks of the river, none possesses greater interest than a group of vessels made of a fine white marble and carved on the outside with a bold design presenting highly distinctive features.

Two vases of this kind were already known in public collections, one in the American Museum of Natural History in New York, and one in the Musée du Trocadéro in Paris; but the provenance of these was unknown before the discoveries to which I have referred.

Some of the sites in which the excavations were conducted are near a native village called Santa Ana. It is an extensive site, and the excavations, although carried to a great depth in order to uncover the deep layers that contained the buried relics, were by no means exhaustive. From time to time in succeeding years the annual floods, undermining the banks, have brought to light various earthenware vessels and carved stone objects similar to those obtained from the excavations on the same site and which are now in the Peabody Museum. Among the artifacts thus unearthed are examples of the elaborately worked stone vases already mentioned, several of which are now in the collections of the University Museum of Philadelphia. One of them illustrates so well the characteristic properties of the purely local art and industry of the Ulua valley that it may stand as representative of the whole class, illustrating as it does the artistic and symbolic attributes as well as the craftsmanship that belongs peculiarly to this group of stone vases from the valley mentioned.

The vase measures nine and three-quarter inches high and six inches broad at the rim. On opposite sides the most striking feature is presented in the form of a pair of projecting handles, which, carved from the one piece of marble, stand out boldly from the circular contour of the vessel. The design of these handles is quite extraordinary, and its execution is no less remarkable. Each handle represents a pair of animals of different kinds, the larger animal in each case, attached dorsally to the body of the vase, forming the main feature of the handle. The head, projecting horizontally, forms the upper part of the handle. The smaller animal is held in the claws of the larger. The position is so reversed that the head forms the lower termination of the handle. The ventral surfaces of the two animals, being brought into close contact, are not sharply defined in the carving of details. The dorsal part of the smaller animal however is carved in detail, with a serrated line which extends from the head to the end of the tail. The head of this smaller animal is turned sideways so as to face to the left in each case.

The animals represented in these two remarkable groups present

GORDON—CONTRIBUTION TO ARCHEOLOGY

distinguishing marks, but it would be idle to attempt to identify the species. There is a presumption in favor of supposing the larger one to be either the jaguar or the puma, because these are the two most conspicuous animals of Central America. There is some suspicion also that the smaller is the iguana.

The cylindrical surface of the vase is divided into four zones. The uppermost zone consists of a plain rim and a sculptured band. Next comes the principal band occupying the body of the vase and entirely covered with ornament of elaborate and curious composition. Below this is another band of ornament corresponding to the one at the top, followed by a narrow plain band. The fourth zone occupies the base of the vessel, which is an inch and a half high. This surface is again divided into two bands, the upper of which is perforated at intervals, while the lower is worked out into a simple decorative border. The broad central zone corresponding to the



FIG. 1

main field of decoration claims especial attention.

In order to explain the elements or units that enter into the composition of this ornament it is necessary to have recourse to drawings and to divide the contour into two semicylindrical surfaces separated by the handles. Figure 1, which may be called the principal unit in the design, is repeated with striking alterations on the other side. The next unit of design is shown in figure 2; it occurs eight times, yet in no case is it repeated in the same form. The other units of design are those shown in figures 3, 4, and 5, each of which again passes through its conjugation on either side of the vessel in making up the composition of the ornament. It is obvious that the units shown in figures 3, 4, and 5 are abstractions borrowed from one of the animal forms. The entire zone of ornament is developed in figure 6.

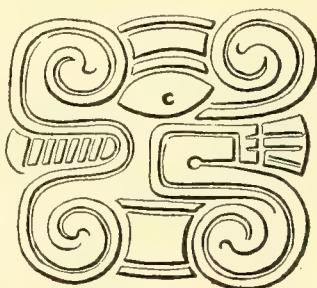


FIG. 2

The distribution of the various units of design is such as to produce a well-balanced effect, and a first glance gives the impression that this balance is produced by repeating the units symmetrically in such manner that each unit is balanced by its counterpart placed in contrary motion opposite. To assume this to

HOLMES ANNIVERSARY VOLUME

be the case, however, would be a great mistake, as anyone will find who attempts to copy the design. The variety of expressions with which the few elements are introduced in their assigned positions in order to give balance without repetition, and with the entire absence of mechanical effect, is admirable. A similar refinement of feeling distinguishes the entire vase. While in itself perfectly symmetrical to the eye, its lines are not mechanical, and they are not laid down



FIG. 3

by any instrument of precision. The ornament in all its parts betrays the same characteristic freedom. Even the bands above and below the main zone, although composed of the same elements, occur in different numerical combinations and in contrary motion.

It would be as useless to speculate concerning the symbolism of all this ornament as it would be to guess at the service for which the vessel was designed. We are at liberty to assume that so elaborate and refined an object had a ceremonial function and that its symbolism corresponds to ideas associated with its use, but its interpretation is quite beyond our reach.

What I am concerned with here, however, is not so much the interpretation of this object with respect to its symbolism as to call attention to its qualities as a work of art. These are of very high order and of such character that they afford striking demonstration of certain relations and bring into view a number of interesting facts. The artist that executed this work was a master of design; it would indeed be difficult to match it anywhere. His art, moreover, is the expression of a liberal culture that must have had a wide application. It had those qualities of conscious power that everywhere marks a definite stage in the progress of human endeavor in the field of art. It corresponds to the period of instinctive feeling. It is a phase of art that belongs to that



FIG. 4



FIG. 5

older inheritance of rugged strength and assurance in which the impulse of the artist's mind is as ingenuous as the work of his hand is spontaneous. It is a phase that always precedes, by a very long way, that period of labored affection and painful groping that is our more recent inheritance in the field of art. It is so remote from our own artistic experience that we wonder at its appeal.

This ancient vase from Honduras carries with it qualities that are common to all treasures of antiquity wherever they may be found. It adds the weight of its testimony to the abounding evidence that

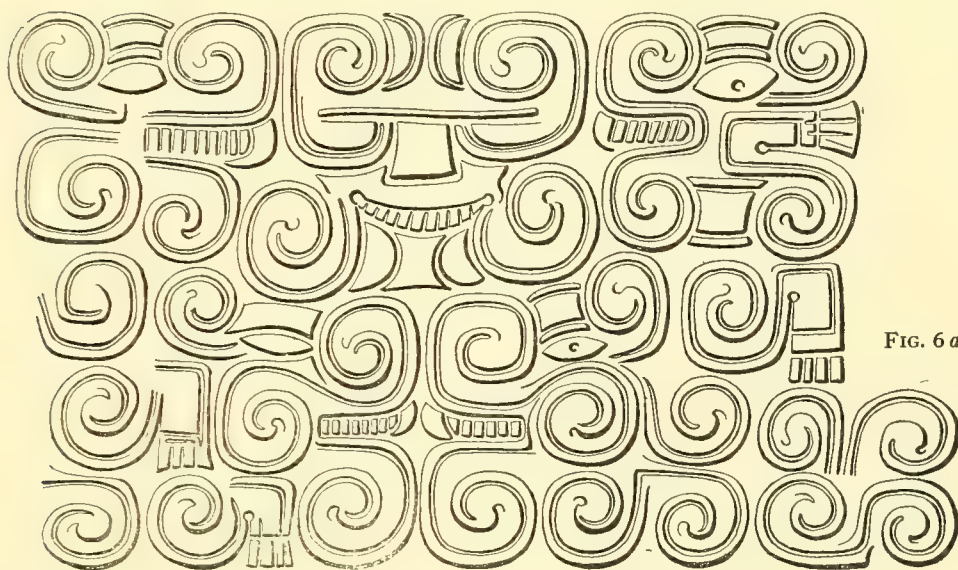


FIG. 6 a

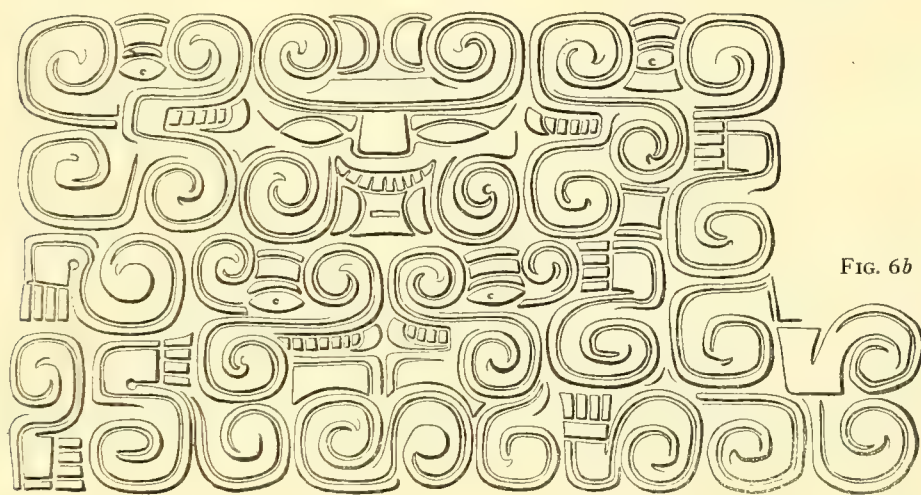


FIG. 6 b

culture in ancient America had made great and diversified advances, and that among many prehistoric peoples of the western continents a very fine artistic sense prevailed. It helps us to form a true estimate of the place which the prehistoric Americans occupied among the civilized peoples of antiquity.

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Ambiguity in the Taos Personal Pronoun

By JOHN PEABODY HARRINGTON



AMBIGUITY in the personal pronoun is a flaw known to occur in a large number of languages, and is always easy to observe and interesting to examine. We can recognize ambiguity in person, illustrated by the German and Scandinavian pronoun for the second and third persons plural, polite form; in number, as in English *you*, second person singular and plural; in gender, as in Russian *oni*, third person nom. plural, masc. and neut.; in case, as in Latin *nobis*, first person plural, dat. and abl. Languages which have developed pronominal systems remarkably rich and highly complicated in form, as, for instance, those of the Tanoan family of New Mexico, find it difficult to avoid an unusual degree of ambiguity. The Taos language of the Tanoan group possesses series of pronouns built up on so elaborate and pretentious a plan as to excite admiration on the first brief examination, but when one reflects that in order to carry out this plan several hundred distinct prefixed pronoun forms would be necessary while only seventy-five different forms actually occur in the language, it is evident how far short of its aims and ambitions the Taos pronominal system must fall. In fact, not only does the context or condition of speaking have to come to the rescue in innumerable instances to show for which one of several possible combinations the pronominal form stands, but frequently the relatively simple free personal pronouns have to be used in addition to the ambiguous prefixed forms in an attempt to make the sense clear. Even this double usage at best succeeds only in making person and case clear, while it fails to make number more definite. In Taos we find numerous examples of pronominal ambiguity in all the categories mentioned above—in person, number, gender, and case.

The pronoun is determined by the noun and the verb. The Taos noun distinguishes two genders, animate and inanimate. The pronoun also distinguishes two genders, but certain verbs and certain inanimate nouns formed from verbs must be preceded by pronouns in *-naⁿ-*. These pronouns in *-naⁿ-* do not distinguish number. The number and gender of the noun, in its unincorporated form, are indicated by postfixes. Some classes of nouns use the postfix regularly

HARRINGTON—TAOS PERSONAL PRONOUN

denoting animate plural in their singular and an animate singular or an inanimate plural postfix in their plural. When nouns of these classes are used the prefixed pronoun agrees with the formal number and gender of the noun, and consideration of these usages in the tabulations below would introduce only unnecessary complexity.

Verbs are formally divided into two classes, those indicating motion (including action) and those indicating position. Verbs of the first class may be either transitive or intransitive. Those of the second class are generally intransitive, but when they are transitive in meaning they must be preceded by pronouns which are not used with regular transitive verbs, namely, series II and VI.

A. PREFIXED PERSONAL PRONOUNS

Gender is distinguished as follows: First and second persons are always animate. The third person may be animate or inanimate; but when used as the first member of the pronominal compound in series II and III or as the first or second member in series IV must always be animate. In series II, III, and IV the gender of the thing possessed or object is always distinguished when the noun referred to is plural, but the same form is used with both genders in the singular.

It is number that the prefixed pronoun distinguishes most thoroughly. In series I, V, and VI number is distinguished perfectly. A persistent attempt to distinguish the number of all members of the pronominal compound is discernible in the other series. Singular, dual, and three plus plural numbers are indicated more or less consistently by the subjective pronouns, by the first members of prefixed pronominal compounds in all series, and by the second members in series IV. Singular and two plus plural number of the thing possessed or object are partially distinguished. Final *-m-* indicates the animate plural, and final *-u-* the inanimate plural of the thing possessed or object. Singular number of the thing possessed or object cannot be indicated in the dual and plural forms of the pronominal compounds of series II and IV, with the exception of the first person pronouns of series II, because these dual and plural forms must end in either the plural *-m-* or *-u-*, and the animate plural form in *-m-* is used not only for the animate plural but also for the animate and inanimate singular of the thing possessed or object. The number of the thing possessed in series II or direct object in series IV can be distinguished perfectly only when the first member of the compound in series II or both the first and second members in series IV are singular.

Series I indicates the subject of verbs used intransitively or passively; series II possessor and gender and number of possessed; series

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III subject and direct object of transitive verbs, the objective element following the subjective; series IV subject, referential object, and direct object, the elements appearing in the order here named; series V to VII, inclusive, are reflexive pronouns, series V indicating the subject-object relation comparable to series III, series VI being required by certain verbs, and corresponding in form to series II, series VII being the same as series III except that the reflexive element replaces the direct object. The pronouns will be better understood from the following tabulations.

I. PREFIXED SUBJECTIVE PRONOUNS

I		<i>a-</i>		
we	(d.)	<i>an-</i>		
we	(pl.)	<i>i-</i>		
you	(s.)	<i>aⁿ-</i>		
you	(d.)	<i>man-</i>		
you	(pl.)	<i>maⁿ-</i>		
		an.	inan.	
he, she, it		—	—	<i>naⁿ-</i>
they	(d.)	<i>an-</i>	<i>an-</i>	<i>naⁿ-</i>
they	(pl.)	<i>i-</i>	<i>u-</i>	<i>naⁿ-</i>

The prefixed subjective pronouns are used only with intransitive verbs and with the passive voice of transitive verbs. Subjective-objective pronouns (series III, below) are required with the active voice of transitive verbs, even though it is not definitely stated what the object is. Examples: *amäⁿ*, I went; *amuⁿja*, I was seen.

This is the series simplest in form, used subjectively only. But when compounded (see other series below) its forms can indicate also objective and referential case. First and third person an. dual are alike, also first and third person an. plural are alike. This identity extends to certain forms in series III, IV, and VII. The forms *an-* and *man-* represent **anaⁿ-*, **maⁿnaⁿ-*, the fuller forms being preserved when *-m-* and *-u-* are postfixed. See the following series.

II. PREFIXED POSSESSIVE PRONOUNS

	with an. noun		with inan. noun
my	(s.) <i>an-</i>	<i>an-</i>	<i>annaⁿ-</i>
	(pl.) <i>anaⁿm-</i>	<i>anaⁿu-</i>	<i>annaⁿ-</i>
our (d.)	(s.) <i>kan-</i>	<i>kan-</i>	<i>kannaⁿ-</i>
	(pl.) <i>kanaⁿm-</i>	<i>kanaⁿu-</i>	<i>kannaⁿ-</i>
our (pl.)	(s.) <i>ki-</i>	<i>ki-</i>	<i>kinaⁿ-</i>
	(pl.) <i>kim-</i>	<i>kiu-</i>	<i>kinaⁿ-</i>

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	with an. noun		with inan. noun	
your (s.)	(s.)	<i>kaⁿ-</i>	<i>kaⁿ-</i>	<i>kaⁿnaⁿ-</i>
	(pl.)	<i>kaⁿm-</i>	<i>kaⁿu-</i>	<i>kaⁿnaⁿ-</i>
your (d.)	(s.)	<i>manaⁿm-</i>	<i>manaⁿm-</i>	<i>mannaⁿ-</i>
	(pl.)	<i>manaⁿm-</i>	<i>manaⁿu-</i>	<i>mannaⁿ-</i>
your (pl.)	(s.)	<i>maⁿm-</i>	<i>maⁿm-</i>	<i>maⁿnaⁿ-</i>
	(pl.)	<i>maⁿm-</i>	<i>maⁿu-</i>	<i>maⁿnaⁿ-</i>
his or her	(s.)	<i>aⁿ-</i>	<i>aⁿ-</i>	<i>aⁿnaⁿ-</i>
	(pl.)	<i>aⁿm-</i>	<i>aⁿu-</i>	<i>aⁿnaⁿ-</i>
their (d.)	(s.)	<i>anaⁿm-</i>	<i>anaⁿm-</i>	<i>annaⁿ-</i>
	(pl.)	<i>anaⁿm-</i>	<i>anaⁿu-</i>	<i>annaⁿ-</i>
their (pl.)	(s.)	<i>im-</i>	<i>im-</i>	<i>inaⁿ-</i>
	(pl.)	<i>im-</i>	<i>iu-</i>	<i>inaⁿ-</i>

The chief use of this series is exactly the same as that of English possessive pronouns, being usable both when the noun is expressed and omitted; it is also required by certain verb-forms to express subject. Examples: *ansudamuⁿja*, my dog was seen; *anmuⁿja*, mine (s.) was seen; *anthälhua*, I remember (him, her, or it).

The series is clearly derived from series I. *-maⁿ*, identical with the animate plural noun postfix *-maⁿ* and here regularly contracted to *-m-*, is added to show animate plural of the noun; it is also added to show animate and inanimate singular of the noun with dual and plural possessor except in first person. *-u-*, identical with the *-u-* inan. pl. of series I, is postfixed to show inanimate plural. The forms in *-naⁿ-* present no irregularities, **anaⁿ-* and **manaⁿ-* being regularly contracted to *-an-* and *-man-* before *-n-*. The first person dual and plural and second person singular pronouns show *k-*, which does not appear in the corresponding forms of series I but has its counterpart in other Tanoan languages; while the first and third person singular show forms quite different from those of series I.

The only ambiguity within the series is the identity of the first person singular and third person dual used with plural nouns; and of the first person singular and third person dual forms in *-naⁿ-*.

III. PREFIXED SUBJECTIVE-OBJECTIVE PRONOUNS

	you (s.)	you (d.)	you (pl.)		
I or we	<i>aⁿ-</i>	<i>maⁿpän-</i>	<i>maⁿpi-</i>		
	an. obj.			inan. obj.	
	him or her	them	it	them	it or them
I	<i>ti-</i>	<i>pi-</i>	<i>ti-</i>	<i>a-</i>	<i>tinaⁿ-</i>
we (d.)	<i>an-</i>	<i>aⁿpän-</i>	<i>an-</i>	<i>kan-</i>	<i>annaⁿ-</i>
we (pl.)	<i>i-</i>	<i>ipi-</i>	<i>i-</i>	<i>kiu-</i>	<i>inaⁿ-</i>

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	me or us				
you (s., d., or pl.)	<i>mai-</i>				
	an. obj.			inan. obj.	
	him or her	them	it	them	it or them
you (s.)	<i>a-</i>	<i>i-</i>	<i>a-</i>	<i>ku-</i>	<i>anaⁿ-</i>
you (d.)	<i>man-</i>	<i>maⁿpän-</i>	<i>man-</i>	<i>man-</i>	<i>mannaⁿ-</i>
you (pl.)	<i>maⁿ-</i>	<i>maⁿpi-</i>	<i>maⁿ-</i>	<i>maⁿu-</i>	<i>maⁿnaⁿ-</i>
	an. obj.			inan. obj.	
	him or her	them	it	them	it or them
he, she	—	<i>i-</i>	—	<i>u-</i>	<i>naⁿ-</i>
they (d.)	<i>an-</i>	<i>aⁿpän-</i>	<i>an-</i>	<i>an-</i>	<i>annaⁿ-</i>
they (pl.)	<i>i-</i>	<i>ipi-</i>	<i>i-</i>	<i>iu</i>	<i>inaⁿ-</i>

This series indicates the relation of subject and direct object. Examples: *tisudamuⁿ*, I see a dog, *ahiumuⁿ*, I see stones.

All the combinations of dual or plural subject with third person animate plural object are composed of a subjective pronoun of series I plus a connective *-p-* followed again by a pronoun of series I here used objectively, *aⁿpän-* and *maⁿpän-* occurring however instead of **anpan-* and **manpan-*. Thus *ipi-*, they pl.—them pl. an., says really they pl.—they pl.; *i-*, they—him, is *i-*, they pl., plus nothing, which is the sign of the third person singular subjective. Likewise *i-*, he or she—them an. and *u-*, he or she—them inan. are merely the subjective pronouns *i-* and *u-* used objectively, the first member of the pronominal compound being nothing. The forms indicating we pl., you pl., and they pl. with plural inanimate objects (*kiu-*, *maⁿu-*, and *iu-*) are identical with the corresponding possessive forms (series II). We d.—them inan., *kan-*, is the same as the first person dual possessive form (series II) with singular noun. Forms indicating I—them inan. (*a-*), we d.—him or her or it inan. (*an-*), we pl.—him or her or it inan. (*i-*), you d.—him or her or it inan. (*man-*), you pl.—him or her or it inan. (*maⁿ-*), they d.—him or her or it inan. (*an-*) and they pl.—him or her or it inan. (*i-*) are the same as the corresponding subjective forms (series I). *aⁿ-*, I or we—you s. is the same as the subjective *aⁿ-*, you s. *maⁿpän-*, I or we—you d. and *maⁿpi-*, I or we—you pl. are the same as the you d.—them an., you pl.—them an. forms. This substitution of second person dual and plural for first person dual and plural forms is carried out consistently throughout series IV and VII. *mai-*, initial *m-* identical with the *m-* of other second person forms, indicates second person subject—first person object, irrespective of number. *ti-*, I—him or her or it inan., *pi-*, I—them an., *a-*, you s.—him or her or it inan., *i-*, you s.—them an. (identical with *i-*, he or

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IV. PREFIXED SUBJECTIVE-OBJECTIVE-REFERENTIAL PRONOUNS

	an. obj.			inan obj.		
	him or her	them	it	them	it or them	
I or we for you (s.)	<i>kaⁿ</i>	<i>kaⁿm-</i>	<i>kaⁿ</i>	<i>kaⁿu-</i>	<i>kaⁿnaⁿ</i>	
I or we for you (d.)	<i>maⁿpänaⁿm-</i>	<i>maⁿpänaⁿm-</i>	<i>maⁿpänaⁿm-</i>	<i>maⁿpänaⁿu-</i>	<i>maⁿpänaⁿ</i>	
I or we for you (pl.)	<i>maⁿpim-</i>	<i>maⁿpim-</i>	<i>maⁿpim-</i>	<i>maⁿpiu-</i>	<i>maⁿpinaⁿ</i>	
I for him or her	<i>taⁿ</i>	<i>taⁿm-</i>	<i>taⁿ</i>	<i>taⁿu-</i>	<i>taⁿnaⁿ</i>	
I for them (d.)	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿu-</i>	<i>aⁿpänaⁿ</i>	
I for them (pl.)	<i>ipim-</i>	<i>ipim-</i>	<i>ipim-</i>	<i>ipiu-</i>	<i>ipinaⁿ</i>	
we (d.) for him, her, or them (d.)	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿu-</i>	<i>aⁿpänaⁿ</i>	
we (d.) for them (pl.)	<i>ipim-</i>	<i>ipim-</i>	<i>ipim-</i>	<i>ipiu-</i>	<i>ipinaⁿ</i>	
we (pl.) for him, her, or them (d. or pl.)	<i>ipim-</i>	<i>ipim-</i>	<i>ipim-</i>	<i>ipiu-</i>	<i>ipinaⁿ</i>	
you (s., d., or pl.) for me or us	<i>maⁿm-</i>	<i>maⁿm-</i>	<i>maⁿm-</i>	<i>maⁿu-</i>	<i>maⁿnaⁿ</i>	
you (s.) for him or her	<i>aⁿ</i>	<i>aⁿm-</i>	<i>aⁿ</i>	<i>aⁿu-</i>	<i>aⁿnaⁿ</i>	
you (s.) for them (d.)	<i>maⁿpänaⁿm-</i>	<i>maⁿpänaⁿm-</i>	<i>maⁿpänaⁿm-</i>	<i>maⁿpänaⁿu-</i>	<i>maⁿpänaⁿ</i>	
you (s.) for them (pl.)	<i>maⁿpim-</i>	<i>maⁿpim-</i>	<i>maⁿpim-</i>	<i>maⁿpiu-</i>	<i>maⁿpinaⁿ</i>	
you (d.) for him, her, or them (d.)	<i>maⁿpänaⁿm-</i>	<i>maⁿpänaⁿm-</i>	<i>maⁿpänaⁿm-</i>	<i>maⁿpänaⁿu-</i>	<i>maⁿpänaⁿ</i>	
you (d.) for them (pl.)	<i>maⁿpim-</i>	<i>maⁿpim-</i>	<i>maⁿpim-</i>	<i>maⁿpiu-</i>	<i>maⁿpinaⁿ</i>	
you (pl.) for him, her, or them (d. or pl.)	<i>maⁿpim-</i>	<i>maⁿpim-</i>	<i>maⁿpim-</i>	<i>maⁿpiu-</i>	<i>maⁿpinaⁿ</i>	
he or she for him or her	<i>aⁿ</i>	<i>aⁿm-</i>	<i>aⁿ</i>	<i>aⁿu-</i>	<i>aⁿnaⁿ</i>	
he or she for them (d.)	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿu-</i>	<i>aⁿpänaⁿ</i>	
he or she for them (pl.)	<i>ipim-</i>	<i>ipim-</i>	<i>ipim-</i>	<i>ipiu-</i>	<i>ipinaⁿ</i>	
they (d.) for him, her, or them (d.)	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿm-</i>	<i>aⁿpänaⁿu-</i>	<i>aⁿpänaⁿ</i>	
they (d.) for them (pl.)	<i>ipim-</i>	<i>ipim-</i>	<i>ipim-</i>	<i>ipiu-</i>	<i>ipinaⁿ</i>	
they (pl.) for him, her, or them (d. or pl.)	<i>ipim-</i>	<i>ipim-</i>	<i>ipim-</i>	<i>ipiu-</i>	<i>ipinaⁿ</i>	

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she—they an.), and *ku-*, you s.—them inan. (the *k-* of series II plus the *u-*, they inan., of series I) are forms the understanding of which must be sought by comparison with other Tanoan languages. The *-naⁿ-* forms are formed by postfixing *-naⁿ-* to the corresponding form indicating a singular object. The forms of this series are used in forming pronouns of series IV and VII.

This series presents numerous ambiguities which are difficult and perplexing to anyone learning to speak the language, as will be seen by study of the tabulation.

Subjective-objective-referential pronouns indicate a relation between animate subject, animate referential object, and animate or inanimate direct object. By referential object is meant a person referred to in connection with the object, including what is expressed in English by the indirect object, proximity to or accompaniment or ownership of object. Thus *taⁿsudamuⁿ*, lit. I—with reference to him—him dog saw, is translatable as I saw the dog for him, I saw the dog by him, I saw the dog with or accompanying him, or I saw his dog. Also with the noun omitted, *taⁿmuⁿ*, I saw him for him, etc. This series bears the same relation to series III that series II bears to series I, and might well be termed subjective-objective-possessive pronouns, except that their use has been extended beyond strictly possessive meaning. There are no special verb forms which require this series.

The dual and plural pronouns of this series are derived from the subjective-objective pronouns (series III) indicating dual subject—an. pl. object and pl. subject—an. pl. object in general by the same process of postfixing *-m-* and *-u-* by which series II is derived from series I, the elements second in order which in series III indicate direct object, in this series indicating referential object. The *k-* of first person subject—second person referential object forms is the same as that appearing in the first person dual and plural and second person singular possessive forms (series II); see also the series III pronouns *kan-*, we d.—them inan., *kiu-*, we pl.—them inan., and *ku-*, you s.—them inan. The *t-* of the first person singular subject—third person singular object forms is the same as that of the first person singular subject—third person singular an. and inan. object of the subjective-objective pronouns (series III). The second person singular pronouns are derived from the second person singular subjective pronoun *aⁿ-* (series I), the third person singular pronouns are the same as the corresponding possessive forms, and the pronouns indicating relation between second person subject and first person referential object, irrespective of number, are identical with the second person plural possessive forms (cf. *mai-*, you s., d., or pl.—me or us). If either the

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first or second member of the pronominal compound is dual and neither is plural, the dual form of the pronoun is used; if either the first or second member is plural, a plural form is used, although the other member may be singular or dual. These dual and plural forms have the animate plural ending *-m-* to indicate both animate plural and animate or inanimate singular of the direct object (see the second and third person dual and plural forms of series II). In brief, the form is determined by the greatest grammatical number indicated by either the first or second element.

This series contains a much larger number of ambiguous forms than series III. Attention is called to the unusual identity between first person singular—for third person and third person singular—for third person forms.

V. PREFIXED REFLEXIVE-RECIPROCAL PRONOUNS

I	myself	ourselves
we (d.)	<i>taⁿ-</i>	<i>kan-</i>
we (pl.)		<i>kima-</i>
you (s.)	yourself	yourselves
you (d.)	<i>aⁿ-</i>	<i>man-</i>
you (pl.)		<i>maⁿma-</i>
he or she	himself or herself	themselves
they (d.)	<i>ma-</i>	<i>an-</i>
they (pl.)		<i>ima-</i>

The pronouns of this series in the singular correspond exactly to English I—myself, etc., used reflexively; in the dual and plural they are used with both reflexive and reciprocal meaning. For example: *taⁿmuⁿ*, I looked at myself; *kanmuⁿ*, we two looked at ourselves, we two looked at each other, each of us two looked at himself. Certain verbs are always preceded by reflexive-reciprocal pronouns unless the meaning of the sentence is such as to require pronouns of series VI or series VII. Thus: *taⁿLai*, I sat down; *taⁿnaⁿupi*, I dived under.

taⁿ-, I—myself, and *aⁿ-*, you—yourself, are identical respectively with *taⁿ-*, I—for him or her (series IV) and *aⁿ-*, you s.—for him or her (series IV). In the third person singular the typical reflexive *-ma-* is used without any preceding element; *ma* also appears throughout the plural, being postfixed to *ki-*, first person plural possessive with s.

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noun (series II) (cf. *i-*, we pl., of series I, but Tewa *gi-*, we pl., subjective), and to *maⁿ-* and *i-*, second and third person plural subjective (series I). The first person dual *kan-* is identical with the first person dual possessive with singular noun (series II), differing, like *ki-* above, from the corresponding subjective form by the presence of *k-*; *man-* and *an-*, second and third person dual forms respectively, are the same as the corresponding subjective forms (series I). These plural forms in *-ma-* are the same as the plural forms of series VI. The dual does not postfix *-ma-*.

This series contains within itself no ambiguous forms.

VI. PREFIXED REFLEXIVE-POSSESSIVE PRONOUNS

	my	our
I	<i>anma-</i>	
we (d.)		<i>kanma-</i>
we (pl.)		<i>kima-</i>
	your (s.)	your (d. or pl.)
you (s.)	<i>kaⁿma-</i>	
you (d.)		<i>manma-</i>
you (pl.)		<i>maⁿma-</i>
	his or her	their
he or she	<i>aⁿma-</i>	
they (d.)		<i>anma-</i>
they (pl.)		<i>ima-</i>

These pronouns cannot be used meaning I—myself—my, etc., as one might suppose, but their usage is restricted to certain verb stems which require them, and to the passives of reflexive verbs. For example: *anmakaqummaⁿ*, I love my mother; *anmaqummaⁿ*, I love (object if expressed must be rendered by free pronoun); *anmaLaka*, he seated himself for them two, lit., they two were sat down for (by him).

These forms are derived by postfixing *-ma-* from the corresponding possessive forms used with singular nouns minus *-m-*; *-aⁿ-* of *manaⁿm-* and *anaⁿm-* is regularly elided.

Like series V, this series contains within it no homonyms.

VII. PREFIXED REFLEXIVE-REFERENTIAL PRONOUNS

	myself or ourselves
I or we for you (s.)	<i>kaⁿma-</i>
I or we for you (d.)	<i>maⁿpänma-</i>
I or we for you (pl.)	<i>maⁿpima-</i>

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I for him or her	myself
I for them (d.)	<i>taⁿma-</i>
I for them (pl.)	<i>aⁿpänma-</i>
	<i>ipima-</i>
we (d.) for him, her, or them (d.)	ourselves
we (d.) for them (pl.)	<i>aⁿpänma-</i>
	<i>ipima-</i>
we (pl.) for him, her, or them (d. or pl.)	<i>ipima-</i>
you (s., d., or pl.) for me or us (d. or pl.)	yourself or yourselves
	<i>maⁿma-</i>
you (s.) for him or her	yourself
you (s.) for them (d.)	<i>aⁿma-</i>
you (s.) for them (pl.)	<i>maⁿpänma-</i>
	<i>maⁿpima-</i>
you (d.) for him, her, or them (d.)	yourselves
you (d.) for them (pl.)	<i>maⁿpänma-</i>
	<i>maⁿpima-</i>
you (pl.) for him, her, or them (d. or pl.)	<i>maⁿpima-</i>
he or she for him or her	himself or herself
he or she for them (d.)	<i>aⁿma-</i>
he or she for them (pl.)	<i>aⁿpänma-</i>
	<i>ipima-</i>
they (d.) for him, her, or them (d.)	themselves
they (d.) for them (pl.)	<i>aⁿpänma-</i>
	<i>ipima-</i>
they (pl.) for him, her, or them (d. or pl.)	<i>ipima-</i>

These pronouns are used the same as series IV, the reflexive element taking the place of the direct object. For example: *taⁿmamuⁿ*, I looked at myself for him or her; *taⁿmaLai*, I seated myself for or by him or her.

This series is derived regularly from series IV in the same way that series VI is derived from series II. It contains all the ambiguous meanings of series IV.

ALPHABETIC LIST OF PREFIXED PRONOUNS

Instead of pointing out all pronominal homonyms in the discussion above, the following complete alphabetic list of prefixed pronouns

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has been compiled for this purpose and its study will give an adequate idea of the amount of ambiguity in the Taos personal pronoun.

1. *a-*. I, series I; I—them inan., III; you s.—him or her, or it inan., III.
2. *an-*. We d., I; they d., I; my with s. an. and inan. noun, II; we d.—him or her, or it inan., III; they d.—him or her, or it inan. or them inan., III; they d.—themselves, v.
3. *anaⁿm-*. My with pl. an. noun, II; their d. with s. or pl. an. noun or s. inan. noun, II.
4. *anaⁿu-*. My with pl. inan. noun, II; their d. with pl. inan. noun, II.
5. *anma-*. I—my, VI; they d.—their, VI.
6. *annaⁿ-*. My with s. or pl. inan. *-naⁿ-* noun, II; their d. with s. or pl. inan. *-naⁿ-* noun, II; we d.—it or them inan. *-naⁿ-* noun, III; they d.—it or them inan. *-naⁿ-* noun, III.
7. *aⁿ-*. You s., I; his or her with s. an. and inan. noun, II; I or we—you s., III; you s.—for him or her—him or her, or it inan., IV; he or she—for him or her—him or her, or it inan., IV; you s.—yourself, v.
8. *aⁿm-*. His or her with pl. an. noun, II; you s.—for him or her—them an., IV; he or she—for him or her—them an., IV.
9. *aⁿma-*. He or she—his or her, VI; you s.—for him or her—yourself, VII; he or she—for him or her—himself or herself, VII.
10. *aⁿnaⁿ-*. His or her with s. or pl. inan. *-naⁿ-* noun, II; you s.—it or them inan. *-naⁿ-* noun, III; you s.—for him or her—it or them inan. *-naⁿ-* noun, IV; he or she—for him or her—it or them inan. *-naⁿ-* noun, IV.
11. *aⁿpän-*. We d.—them an., III; they d.—them an., III.
12. *aⁿpänaⁿm-*. I—for them d.—him or her, or them an., or it inan., IV; we d.—for him or them d.—him or her, or them an., or it inan., IV; he or she—for them d.—him or her, or them an., or it inan., IV; they d.—for him or her or them d.—him or her, or them an., or it inan., IV.
13. *aⁿpänaⁿu-*. I—for them d.—them inan., IV; we d.—for him or her or them d.—them inan., IV; he or she—for them d.—them inan., IV; they d.—for him or her or them d.—them inan., IV.
14. *aⁿpänma-*. I—for them d.—myself, VII; we d.—for him or her or them d.—ourselves, VII; he or she—for them d.—himself or herself, VII; they d.—for him or her or them d.—themselves, VII.
15. *aⁿpännaⁿ-*. I—for them d.—it or them inan. *-naⁿ-* noun, IV; we d. for him or her or them d.—it or them inan. *-naⁿ-* noun, IV; he or she—for them d.—it or them inan. *-naⁿ-* noun, IV; they d.—for him or her or them d.—it or them inan. *-naⁿ-* noun, IV.
16. *aⁿu-*. His or her with pl. inan. noun, II; you s.—for him or her—them inan., IV; he or she—for him or her—them inan., IV.
17. *i-*. We pl. I; they pl. I; we pl.—him or her, or it inan., III; you s.—them an., III; he or she—them an., III; they pl.—him or her, or it inan., III.
18. *im-*. Their pl. with s. or d. an. noun or s. inan. noun, II.
19. *ima-*. They pl.—themselves, v; they pl.—their, VI.
20. *inaⁿ-*. Their pl. with s. or pl. inan. *-naⁿ-* noun, II; we pl.—it or them inan. *-naⁿ-* noun, III; they pl.—it or them inan. *-naⁿ-* noun, III.
21. *ipi-*. We pl.—them an., III; they pl.—them an., III.
22. *ipim-*. I—for them pl.—him or her, or them an., or it inan., IV; we d.—for them pl.—him or her, or them an., or it inan., IV; we pl.—for him or her, or

HARRINGTON—TAOS PERSONAL PRONOUN

them d. or pl.—him or her, or them an., or it inan., IV; he or she—for them pl.—him or her, or them an., or it inan., IV; they d.—for them pl.—him or her, or them an., or it inan., IV; they pl.—for him or her, or them d. or pl.—him or her, or them an., or it inan., IV.

23. *ipima-*. I—for them pl.—myself, VII; we d.—for them pl.—ourselves, VII; we pl.—for him or her, or them d. or pl.—ourselves, VII; he or she—for them pl.—himself or herself, VII; they d.—for them pl.—themselves, VII; they pl.—for him or her, or them d. or pl.—themselves, VII.

24. *ipinaⁿ-*. I—for them pl.—it or them inan. *-naⁿ-* noun, IV; we d.—for them pl.—it or them inan. *-naⁿ-* noun, IV; we pl.—for him or her, or them d. or pl.—it or them inan. *-naⁿ-* noun, IV; he or she—for them pl.—it or them inan. *-naⁿ-* noun, IV; they d.—for them pl.—it or them inan. *-naⁿ-* noun, IV; they pl.—for him or her, or them d. or pl.—it or them inan. *-naⁿ-* noun, IV.

25. *ipiu-*. I—for them pl.—them inan., IV; we d.—for them pl.—them inan., IV; we pl.—for him or her, or them d. or pl.—them inan., IV; he or she—for them pl.—them inan., IV; they d.—for them pl.—them inan., IV; they pl.—for him or her, or them d. or pl.—them inan., IV.

26. *iu-*. Their pl. with pl. inan. noun, II; they pl.—them inan., III.

27. *kan-*. Our d. with s. an. or inan. noun, II; we d.—them inan., III; we d.—ourselves, V.

28. *kana^m-*. Our d. with pl. an. noun, II.

29. *kanaⁿu-*. Our d. with pl. inan. noun, II.

30. *kanma-*. We d.—our, VI.

31. *kannaⁿ-*. Our d. with s. or pl. inan. *-naⁿ-* noun, II.

32. *kaⁿ-*. Your s. with s. an. and inan. noun, II; I or we—for you s.—him or her, or it inan., IV.

33. *ka^m-*. Your s. with pl. an. noun, II; I or we—for you s.—them an., IV.

34. *kaⁿma-*. You s.—your, VI; I or we—for you s.—myself or ourselves, VII.

35. *kaⁿnaⁿ-*. Your s. with s. or pl. inan. *-naⁿ-* noun, II; I or we—for you s.—it or them inan. *-naⁿ-* noun, IV.

36. *kaⁿu-*. Your s. with pl. inan. noun, II; I or we—for you s.—them inan., IV.

37. *ki-*. Our pl. with s. an. or inan. noun, II.

38. *kim-*. Our pl. with pl. an. noun, II.

39. *kima-*. We pl.—ourselves, V; we pl.—our, VI.

40. *kinaⁿ-*. Our pl. with s. or pl. inan. *-naⁿ-* noun, II.

41. *kiu-*. Our pl. with pl. inan. noun, II; we pl.—them inan., III.

42. *ku-*. You s.—them inan., III.

43. *ma-*. He or she—himself or herself, V.

44. *mai-*. You s., d., or pl.—me or us d. or pl., III.

45. *man-*. You d., I; you d.—him or her, or it inan., or them inan., III; you d.—yourselves, V.

46. *mana^m-*. Your d. with s. or pl. an. noun or s. inan. noun, II.

47. *manaⁿu-*. Your d. with pl. inan. noun, II.

48. *manma-*. You d.—your, VI.

49. *mannaⁿ-*. Your d. with s. or pl. inan. *-naⁿ-* noun, II; you d.—it or them inan. *-naⁿ-* noun, III.

50. *maⁿ-*. You pl., I; you pl.—him or her, or it inan., III.

51. *ma^m-*. Your pl. with s. or pl. an. noun or s. inan. noun, II; you s., d., or pl.—for me or us—him or her, or them an., or it inan., IV.

52. *maⁿma-*. You pl.—yourselves, V; you pl.—your, VI; you s., d., or pl.—for me or us—yourself or yourselves, VII.

HOLMES ANNIVERSARY VOLUME

53. *maⁿnaⁿ-*. Your pl. with s. or pl. inan. -*naⁿ-* noun, II; you pl.—it or them inan. -*naⁿ-* noun, III; you s., d., or pl.—for me or us—it or them inan. -*naⁿ-* noun, IV.

54. *maⁿpān-*. I or we—you d., III; you d.—them an., III.

55. *maⁿpānaⁿm-*. I or we—for you d.—him or her, or them an., or it inan., IV; you s.—for them d.—him or her, or them an., or it inan., IV; you d.—for him or them d.—him or her, or them an., or it inan., IV.

56. *maⁿpānaⁿu-*. I or we—for you d.—them inan., IV; you s.—for them d.—them inan., IV; you d.—for him or her or them d.—them inan., IV.

57. *maⁿpānma-*. I or we—for you d.—myself or ourselves, VII; you s.—for them d.—yourself, VII; you d.—for him or her or them d.—yourselves, VII.

58. *maⁿpānnaⁿ-*. I or we—for you d.—it or them inan. -*naⁿ-* noun, IV; you s.—for them d.—it or them inan. -*naⁿ-* noun; you d.—for him or her, or them d.—it or them inan. -*naⁿ-* noun, IV.

59. *maⁿpi-*. I or we—you pl., III; you pl.—them an., III.

60. *maⁿpim-*. I or we—for you pl.—him or her, or them an., or it inan., IV; you s.—for them pl.—him or her, or them an., or it inan., IV; you d.—for them pl.—him or her, or them an., or it inan., IV; you pl.—for him or her or them d. or pl.—him or her, or them an., or it inan., IV.

61. *maⁿpima-*. I or we—for you pl.—myself or ourselves, VII; you s.—for them pl.—yourself, VII; you d.—for them pl.—yourselves, VII; you pl.—for him or her, or them d. or pl.—yourselves, VII.

62. *maⁿpinaⁿ-*. I or we—for you pl.—it or them inan. -*naⁿ-* noun, IV; you s.—for them pl.—it or them inan. -*naⁿ-* noun, IV; you d.—for them pl.—it or them inan. -*naⁿ-* noun, IV; you pl.—for him or her, or them d. or pl.—it or them inan. -*naⁿ-* noun, IV.

63. *maⁿpiu-*. I or we—for you pl.—them inan., IV; you s.—for them pl.—them inan., IV; you d.—for them pl.—them inan., IV; you pl. for him or her, or them d. or pl.—them inan., IV.

64. *maⁿu-*. Your pl. with pl. inan. noun, II; you pl.—them inan., III; you s., d., or pl.—for me or us—them inan., IV.

65. *naⁿ-*. It inan. -*naⁿ-* noun or they two plus pl. inan. -*naⁿ-* noun, I; he or she—it or them inan. -*naⁿ-* noun, III.

66. *pi-*. I—them an., III.

67. *iaⁿ-*. I—for him or her—him or her, or it inan., IV; I—myself, V.

68. *taⁿm-*. I—for him or her—them an., IV.

69. *taⁿma-*. I—for him or her—myself, VII.

70. *taⁿnaⁿ-*. I—for him or her—it or them inan. -*naⁿ-* noun, IV.

71. *taⁿu-*. I—for him or her—them inan., IV.

72. *ti-*. I—him or her or it inan., III.

73. *tinaⁿ-*. I—it or them inan. -*naⁿ-* noun, III.

74. *u-*. They pl. inan., I; he or she—them inan., III.

75. —. He or she, or it inan., I; he or she—him or her, or it inan., III.

B. FREE PERSONAL PRONOUNS

Subjective or Objective	Referential	Reflexive
1st. pers. <i>naⁿ</i>	<i>naⁿmki</i> , <i>naⁿthati</i>	<i>naⁿta</i>
2d. pers. <i>äⁿ</i>	<i>äⁿmki</i> , <i>äⁿthati</i>	<i>äⁿta</i>
3d. pers. <i>aⁿwaⁿnaⁿ</i>	<i>aⁿwaⁿnaⁿmki</i> , <i>aⁿwaⁿnthati</i>	<i>aⁿwaⁿnta</i>

HARRINGTON—TAOS PERSONAL PRONOUN

The free or unprefixd pronouns, usually omitted, may be added for emphasis or, what is of especial interest to us here, to make clear the confusion of person or case resulting from defective prefixed pronouns. When used subjectively or reflexively they usually precede the verb cluster; when used objectively or referentially they frequently follow it. Possessing distinct forms for the three persons and clearly indicating case by position or postfixes, yet not distinguishing number, ambiguity in person or case but not in number is avoided by their use. They are needed especially to make up for the lack of prefixed subjective-referential forms indicating first or second person as the direct object.

The subjective or objective forms are equally common as subject or direct object. They are also used with prefixed possessives (series II). The referential forms in *-mki* and *-thati* indicate any referential or indirect object relation, but are never used to indicate possession, and those in *-thati* are used with subjective-objective prefixed pronouns and never with subjective-objective-referential pronouns as the forms in *-mki* occasionally are. The reflexive pronouns are used with the reflexive series (V).

Examples of the various usages are:

1. Free pronoun emphasizes, but prefixed pronoun alone is perfectly clear: *amäⁿhua*, I am going, *naⁿ amäⁿhua*, I am going; *taⁿmuⁿ*, I looked at myself, *naⁿta taⁿmuⁿ*, I looked at myself.

2. Free pronoun makes otherwise ambiguous meaning perfectly clear: *anmäⁿhua*, we d. are going or they d. are going, *naⁿ anmäⁿhua*, we d. are going; *anaⁿmsudahuta*, my dogs were killed or their d. dogs were killed, *naⁿ anaⁿmsudahuta*, my dogs were killed; *maⁿpimuⁿ*, I or we saw you pl. or you pl. saw them an. pl., *äⁿ maⁿpimuⁿ* or *äⁿ maⁿpimuⁿ aⁿwaⁿnaⁿ*, you pl. saw them an. pl. (cf. under 3 below).

3. Free pronoun corrects ambiguity of person, but ambiguity of number remains: *maⁿpimuⁿ*, I or we saw you pl. or you pl. saw them an. pl., *naⁿ maⁿpimuⁿ* or *naⁿ maⁿpimuⁿ äⁿ*, I or we saw you pl. (cf. under 2 above); *maⁿpänaⁿmkahu*, I or we killed you d. mother(s) or you s. or d. killed his, her, or their d. mother(s), *naⁿ maⁿpänaⁿmkahu*, I or we killed your d. mother(s), *äⁿ maⁿpänaⁿmkahu*, you s. or d. killed his, her, or their d. mother(s).

4. Free pronoun expresses combination which cannot be expressed by prefixed pronoun alone, but ambiguity in number usually remains: *tisudamaⁿ*, I brought a dog, *tisudamaⁿ naⁿmki*, I brought a dog for myself; *maⁿpänhu*, I or we killed you d. or you d. killed them d., *naⁿ maⁿpänhu aⁿwaⁿnaⁿmki*, I or we killed you d. for him or them; *maⁿmsudahu*, you s., d., or pl. killed my or our dog(s) or you s., d.,

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or pl. killed the dog(s) for me or us, *maⁿmsudahu naⁿmki*, you s., d., or pl. killed my or our dog(s) for me or us.

Thus it is seen that although the Taos system of personal pronouns is elaborate and is admirable in that some of its forms have fewer syllables than those of a language which uses a system like that of English, yet unnecessary complexity and a surprising degree of ambiguity are the defects of the system, and double usages are often actually resorted to in a more or less unsuccessful attempt to avoid this ambiguity.

BUREAU OF AMERICAN ETHNOLOGY
WASHINGTON, D.C.



LAST OF THE CLEARING AT QUIRIGUA

Latest Work of the School of American Archaeology at Quirigua

By EDGAR L. HEWETT



THE last season in Guatemala was more productive than that of former years, owing to the fact that no dead work remained to be done. The preparatory work at Quirigua was in some respects the most difficult that has been encountered at any important archeological site. The clearing off of the tropical jungle occupied nearly two seasons. The finish of that work without harm to buildings or monuments brought great relief (pl. I, II). The last season, that of 1914, was devoted entirely to excavation, exploration, the making of replicas of the monuments, and the study of special problems.

During the season one additional building was entirely uncovered and another about two-thirds laid bare. The latter (pl. III) belongs to the upper level of buildings and appears to be contemporaneous with the large one on the same level (pl. IV) excavated during a previous season. It is built of the red sandstone like all the larger temples and the majority of the greater monuments.

The smaller temple was constructed of building material different from that of the larger ones. Here we find little of the red sandstone. The material is largely a gray volcanic rock containing black particles. This stone is plentifully interspersed with blocks of fine, compact, white marble. Search for the origin of the stone in this building has not disclosed the source of the gray volcanic material. It is the same as that used in the construction of the small, low temple excavated in 1912 (pl. IV), of the monument known as the Dragon, and of the two lesser monuments, the Great Seal and the Tiger Head. The marble may have come from the quarries about fifty miles farther up the Rio Motagua.

It will be remembered by those who have followed the reports of the excavations at Quirigua that the two monuments last named are covered with inscriptions of a very archaic style and that students of Central American inscriptions have not been able to place them in the chronological series. The Dragon appears to belong in style of sculpture with the rest of the larger monuments at Quirigua, though on the evidence of the glyphs Mr Bowditch places it earlier than the others.

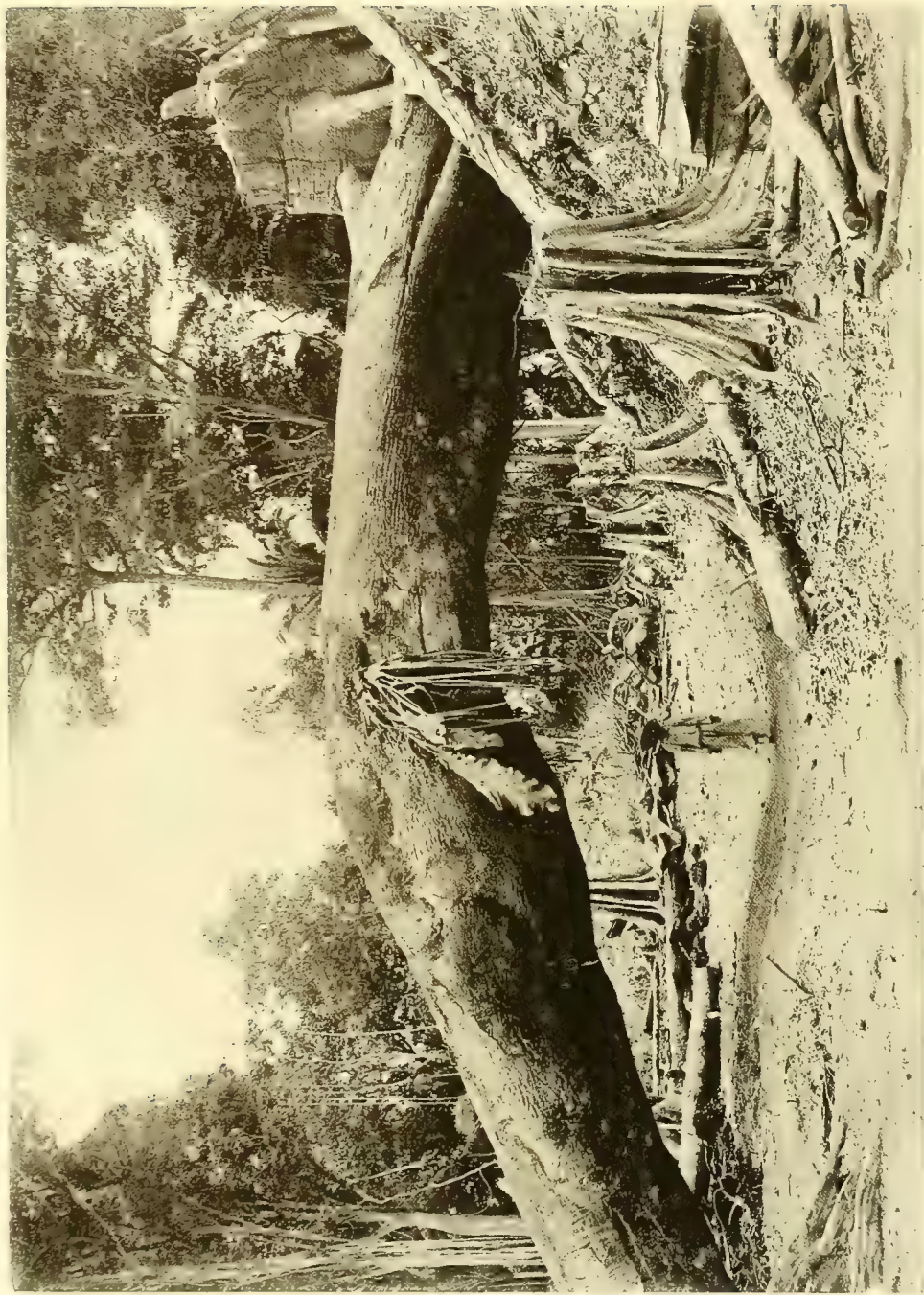
HOLMES ANNIVERSARY VOLUME

The building material of the small temple excavated in 1914, its level in the city, and its general method of construction, conform to that of the small one on the southern side of the quadrangle (pl. iv). These two low buildings appear to underlie the greater temples of the higher level, which are of red sandstone. They are more archaic in appearance, much smaller, devoid of inscriptions, and poorer in ornamentation. It seems reasonable to place them in time with the lesser monuments above referred to.

The indications are that we have here the remains of two cities of different epochs. The upper one at its foundation level is about a meter below the present surface of the Motagua valley, which has been silting up gradually during past ages at a nearly uniform rate. A study of several miles of railroad cuts and of ditches through the plantations of the United Fruit Company leads to the conclusion that the overflow of the Rio Motagua (pl. v) during the height of the rainy season results in a slight building up of the general level. If we are correct in our chronology of the monuments and temples which belong to the last epoch, the later city of Quirigua flourished during the early centuries of the Christian Era, and, since the time of its abandonment, the general level of the valley has been raised about one meter. This gives a fairly safe time measure to apply to the stratification that has been going on in recent centuries.

The conclusion is that from a yard to a meter of silt has been deposited during the last sixteen hundred years. This amount was accumulated around the foundations of the larger temples and the bases of the larger monuments. Confirmation of this is found in the location of hundreds of village sites scattered over the valley in which only the tops of the mounds appear above the surface. Excavation shows that they were situated upon the flood-plain of the valley as it was when the later city of Quirigua was flourishing. These sites probably represent the villages of the people who were tributary to the temple city. They are numerous enough over the valley and upon the adjacent hills to indicate a very large population within a radius of five miles, taking the great Plaza as a center. These villages contain no important temple ruins, and in only two of them have monuments been found.

The above describes briefly the situation in the Motagua valley in the early centuries of the Christian Era, if the American method of correlating the Maya and Christian calendars is correct. Should the German system be the correct one, we must place this period, which for convenience we will call the Golden Age of Central America, from ten to fifteen centuries earlier and consider it contemporary with one of the great periods in the history of Egypt.



LAST OF THE "JUNGLE KINGS" AT QUIRIGUA

HEWETT—WORK AT QUIRIGUA

Referring again to the two buildings of the lower level that have been excavated, we find their superstructures partially imbedded in the substructures of the upper and later temples. We connect with these the lesser monuments, which were made of gray, volcanic stone. The bases of these lower temples lie from three and a half to four feet below the upper culture level. We have thus established two different strata of culture at Quirigua: the one approximately one meter below the present surface, the other rather more than two meters below. On the evidence of the inscriptions, we establish the period of the later Quirigua at from fifteen to eighteen hundred years ago. We must assign to the older level an age of from three thousand to thirty-six hundred years, if the silting up of the Motagua valley gives an approximately accurate basis for measuring time.

We may now consider another series of observations made during the last season, the results of which remain to be tested by extensive trenching. This was by sinking shafts in various quarters of the plazas at Quirigua, which were put down in several places with nearly uniform results. They show the following:

1. At a depth of a meter below the present surface is a culture stratum containing potsherds, charcoal, and red sandstone building blocks belonging to the later city. Then comes approximately a yard of silt containing little or no cultural material and showing something like uniform deposition.

2. At a depth of not quite seven feet below the surface is another culture stratum containing potsherds, charcoal, and building material of gray, volcanic stone belonging to the period of the older or second level of buildings and the lesser monuments. As the strata conform in the different shafts put down, we assume that we have here encountered the level of the older city.

3. Going through another stratum of silt to a depth of ten to twelve feet below the present surface, we come to a third level of culture, lying at least six feet below the present normal level of the Motagua river. It contains an abundance of potsherds, charcoal, and flaked stone, and has yielded no evidence of building material or of inscriptions. The potsherds are different from anything found in the upper levels. There are thus indicated three levels of culture—periods of high development separated by long intervals devoid of the evidences of sedentary life (fig. 1).

If the observations above described are confirmed and the method of calculation is reliable, we have found at Quirigua cultural remains dating back five or six thousand years. It will establish a substratum for the great Maya civilization with evidence of long cultural undula-

HOLMES ANNIVERSARY VOLUME

tions. One of the mysteries of Central American archeology has been the absence of beginnings, Maya civilization appearing only in a high stage of development, therefore making it seem to be derived from somewhere else. The new evidence would indicate that it was not foreign, but autochthonous. Such a conclusion makes the Maya problem more comprehensible.

New explorations in the vicinity of Quirigua have yielded one important discovery, namely, that of a new stela not previously described.¹

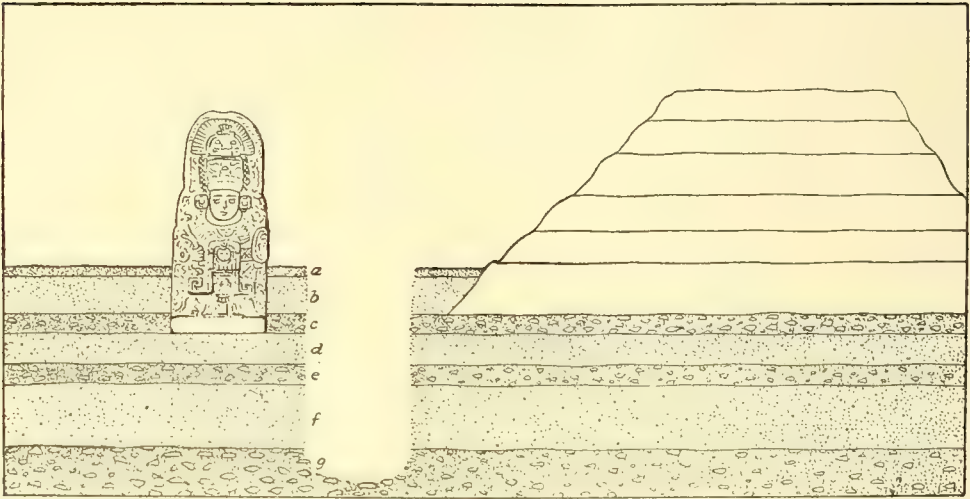


FIG. 1.—Stratification of the great plaza at Quirigua. (a, Present ground level; b, Silt; c, Ground level of last occupancy; d, Silt; e, Ground level of second occupancy; f, Silt; g, Ground level of earliest occupancy.)

The monument (pl. VII) is a true stela (inscribed monument or pillar) seven feet high by four feet wide and three and half feet thick. It has three faces covered with hieroglyphic inscriptions. Upon the south side is a sculptured figure badly weathered.

The monument does not belong to the city of Quirigua; it stands a mile west of the northernmost stela of the Quirigua group in the plaza of a small village site of which three mounds forming sides of a quadrangle are to be seen.

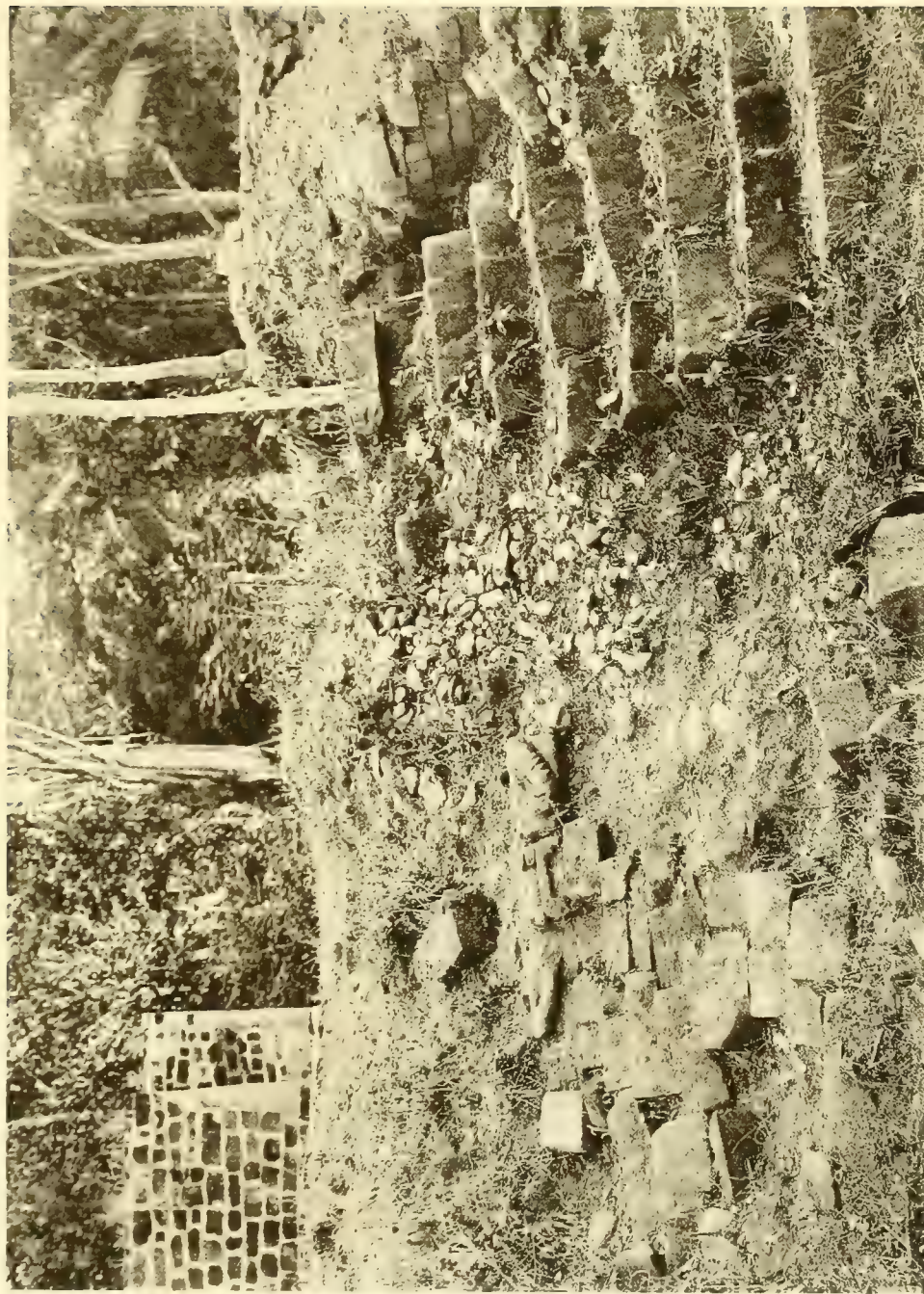
The stela at first sight presents the appearance of exceptional antiquity, but this is due largely to the quality of the stone, the block being decidedly inferior to any used in the monuments at Quirigua. It is well-nigh devoid of ornamentation.

The style of glyph sculpture is that of the oldest monuments at Quirigua.

¹ *El Palacio*, Santa Fe, N. Mex., Feb.-Mar. 1914.



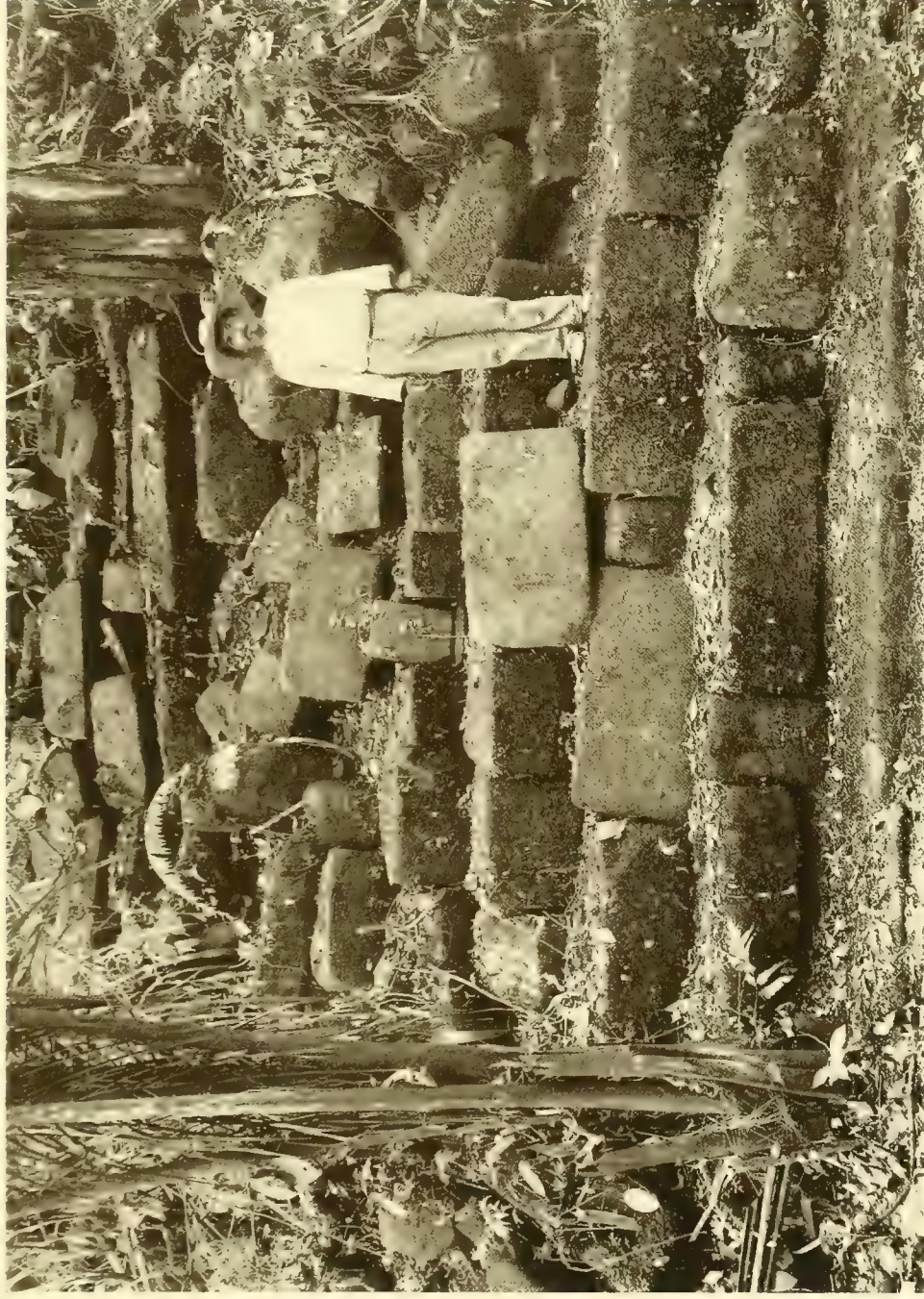
GALLERIES IN THE SECOND TEMPLE, QUIRIGUA



BUILDINGS OF UPPER AND LOWER LEVELS EXCAVATED IN 1912



MOTAGUA RIVER IN FLOOD SEASON



STAIRWAY IN THE TEMPLE PLAZA, QUIRIGUA



a

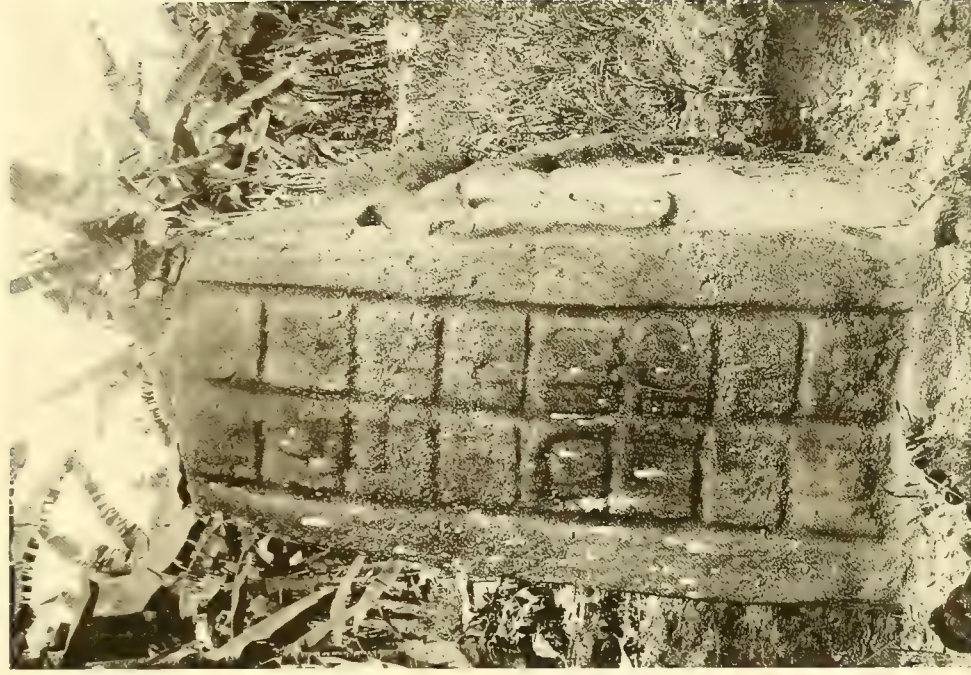


b

LATEST STELA FOUND NEAR QUIRIGUA
(*a*, Front; *b*, East Side)



a



b

NEW STELA NEAR QUIRIGUA
(*a*, North Side, Initial Series; *b*, West Side)



REPLICA OF STELA D, QUIRIGUA, IN SAN DIEGO MUSEUM



REPLICA OF STELA E, QUIRIGUA, IN SAN DIEGO MUSEUM



HEAD USED IN MURAL DECORATION AT QUIRIGUA (SIDE VIEW SHOWING TENON)



HEADS USED IN MURAL DECORATION, QUIRIGUA
(*a*, Front View; *b*, Side View showing Grotesque Head)

HEWETT—WORK AT QUIRIGUA

The inscriptions comprise twenty-three glyph blocks on the northern side, sixteen on the western, and sixteen on the eastern, two of which are obliterated, making a total of fifty-five. Many of the glyphs are so badly weathered that identification will be impossible.

By a fortunate circumstance, the stela leaning slightly to the north so as to protect the glyph panel on that side from weathering, the Initial Series is the best preserved of any part of the inscription. It is badly damaged, and beyond the first two glyphs not legible with absolute certainty. The right half of the panel is occupied by eighteen glyphs. On the left side, in large size, are the five essential blocks of the Initial Series. It is possible that there may have been at the top of the column an introductory glyph which is almost obliterated. This monument marks a date approximately five years earlier than the oldest at Quirigua, and is the earliest that has been recovered in the Motagua valley proper. Another shaft has been found in an outlying village, but it is without date or sculpture of any kind.

An important part of the work of the last season at Quirigua was that of making replicas of the monuments, which marks the first successful use of glue molds in the tropics. Heretofore copying has been done with papier mâché or with plaster. The process used at this time has been described by Mr Neil M. Judd¹ and need not be repeated here, except to say that the results are almost perfect reproductions. The hieroglyphic inscriptions may be studied from the replicas which are now set up in the San Diego Museum (pl. ix, x), as well as upon the original monuments. Even the texture of the stone is perfectly shown.

The replicas made include stelæ E, D, C, and K, and animal figures B and P, using the nomenclature of Mr Maudsley; in the numerical system used in the reports of the School of American Archaeology, numbers 5, 4, 7, 13, 6, and 10. Replicas were made of the two lesser monuments known as the Tiger Head and the Great Seal, and of the heads found in the excavation of Temple No. 1 (pl. xi, xii). This leaves eight monuments still to be copied. It is deemed of first importance to do this soon, on account of the fate that has befallen some of those at Copan.

Among the special studies of the last expedition, only one will be mentioned, viz., that of the Leaning Monument. The work of making the replica enabled us to cover every square inch of the surface. It will be remembered that it leans thirteen and a half feet from the perpendicular, having something more than twenty-six feet exposed

¹ *American Anthropologist*, Jan.-Mar. 1915.

HOLMES ANNIVERSARY VOLUME

above ground, with an unknown projection beneath the surface. The mystery of its remaining in its leaning position is greater than that of the Leaning Tower of Pisa for the reason that, with the latter, the center of weight is well within the base, whereas with the Leaning Monument of Quirigua the center of weight is far outside.

A study of the three exposed surfaces shows a considerable amount of climatic erosion. Everywhere the spicules of quartz distributed through the sandstone have been exposed by long weathering, so that they project above the surface from an eighth to a quarter of an inch. Examining the under-surface of the monument we find the cutting as clear and unweathered as if done in recent times. This leads to the conclusion that the under-surface has never been exposed to the weather, consequently that the shaft never stood erect so as to give this side an equal share of weathering with the other three. It indicates that the people who raised the great monuments here undertook something beyond the limit of their power. They probably worked by prying and by blocking with stone and logs, to a point beyond which further power could not be applied by this method. They would then be compelled to raise the shaft to its final erect position by means of ropes and pulleys operated by hundreds if not thousands of men. It would seem that they were unable to apply sufficient power to draw this, the heaviest of all their monuments, into its final place. It may have remained supported by blocks during the entire life of the city, during which time it would gradually settle. In course of time the compression of the earth about the base, which is deeply imbedded, would be sufficient to hold the monument as it is now.

This is the most satisfactory conclusion concerning this monument. It is not conceivable that, once erected, it could have been partially overthrown by an earthquake. Its momentum, in case of a fall initiated by any conceivable cause, would have been too great to permit of its being stopped.

Those who had a part in the expedition of 1914 were the Director, Carlos Vierra, Neil M. Judd, Earl H. Morris, Wesley Bradfield, Ruth Laughlin, Ralph Linton, and A. Poli. The most important outcome of it was the establishment of the permanent Maya Museum at San Diego,¹ in which the replicas, the Vierra frescoes of Central American cities, and the Maya frieze by Mrs Jean Beman Cook-Smith are conspicuous features.

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¹*Art and Archaeology*, Nov. 1915.



QUIRIGUA RESTORED
(From a Painting by Carlos Viera)

The Requickenin Address of the League of the Iroquois

By J. N. B. HEWITT



THE League or Confederation of the Iroquois, at the time of its establishment, about 1570, was constituted of five linguistically cognate tribes which occupied, when first known, chiefly the central and the eastern parts of the present State of New York.

The tribes so leagued in an organic unity were the Mohawk, the Onondaga, the Seneca, the Oneida, and the Cayuga. And at that time these peoples were united (a fact hitherto unknown) in a more or less close alliance with the famous Neutral Nation of the Iroquoian linguistic stock, which, through the noted chieftainess Djigonsasen (the Wildcat) took an active part in the conferences and deliberations preliminary to the formation of the League and of this alliance. This alliance, however, was not wrought into permanent organic form, and so, in the extant structure of the League, there appears no evidence of this important alliance, not even nominal recognition of the Neutral Nation; but there are, however, some essential features of the structure of the League which tradition ascribes to the work of this broad-minded chieftainess of the Neutral Nation.

Iroquoian civil and religious polity is based on a fundamental dualism, which consists in the symbolic representation of the male and the female sexes in the organic structure of the civil and the religious public institutions. This formal recognition of the activities of the sexes was first wrought into the structure of the tribe, and then, later, into that of the League or Confederation. This obtrusive symbolization of the two sexes in the tribal and the federal institutional organizations is designed to secure and to promote the procreative fertility of the community, and it appears to be the product of naïve unquestioning trust in the efficacy of symbols, which is so common to undeveloped mentation.

An Iroquoian tribe is composed of clans; the League or Confederation of the Iroquois is in like manner composed of tribes. The clans of a tribe are organized into two basic organic units—two sisterhoods of clans—each of which is composed of one or more clans which are correlated one with another as sisters, this being the descriptive term

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indicative of their kinship relations; the clans of one of these sisterhoods address the clan or clans of the other sisterhood as "our cousins". In its unmodified form each sisterhood was exogamous.

The tribes of the League or Confederation are organized in two basic organic units—in two sisterhoods of tribes—each of which is constituted of two or more tribes which are correlated one with another as sisters, this being the descriptive term indicative of their kinship relations; the tribes of one of these sisterhoods of tribes address the tribes of the other sisterhood as "our cousins". Theoretically, if not now demonstrable in fact, these tribal sisterhoods were exogamous.

But with regard to the clan and tribal groups, constituting the trenchant dualism just described, there is a higher or ritualistic form of address which is special and peculiar either to the one or to the other of the two basic organic units, i.e., is peculiar to the male or father group of clans or tribes, or to the female or mother group, as defined in preceding paragraphs. The sisterhood of clans, or the sisterhood of tribes, representing symbolically the male sex, is addressed as "my father's clansmen" or "our father's clansmen", because the side of the male sex is the father side or father clan-group, or father tribe-group. Again, the sisterhood of clans, or the sisterhood of tribes, representing symbolically the female sex, is addressed as "my offspring" or "our offspring", because, in the fireside family, the children belong to the "mother", and as this is the mother group or side—the mother clan-group—it is also the "offspring" group or side; but this group or side may also be addressed as "woman", as may be seen in the words of the so-called "six songs". Thus, it is seen that the fundamental dualism consists of the concepts—male sex or principle, the father, the fatherhood, in nature, on the one hand, and the female sex or principle, the mother, the motherhood, in nature, on the other.

For the purpose of this paper it will be needful here to say that the federal or league dualism consisted, on the father side, of the Mohawk, the Onondaga, and the Seneca tribes, and on the mother side, of the Oneida and the Cayuga tribes, the three tribes forming a sisterhood of tribes, and the two tribes forming another sisterhood of tribes. These sisterhoods have also been called phratries of tribes in the literature relating to these Iroquoian tribes and their League or Confederation.

In every place of public assembly there is, or at least there is assumed to be, a hearth or fire-altar, some distance from either end of the song-bench which occupies the central part of the room or space,

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and which serves as a divisional line between the father and the mother sides or tribal groups of the League, for the father group of tribes occupies one side of the fire, and the mother group of tribes the other, in both civil and religious public assemblies.

It is one of the rules or laws of the federal organization that in the case of the death of one or more chiefs in either tribal sisterhood the tribes of this sisterhood become mourners for a year or until the vacant chiefship or chiefships shall have been filled in accordance with strict rules of ritualistic procedure, which govern a large part of the proceedings of the so-called Council of Condolence and Installation of Chiefs. It is then the official duty of the other sisterhood of tribes to perform the rites and ceremonies of this council for the rehabilitation of its cousin sisterhood of tribes; for during the period of its mourning it should not transact any public business.

The subject of this paper forms one of the essential parts of the ritual of this council. The Requickening Address in the ritual of the Condoling and Installation Council of the League or Confederation of the Iroquois derives its name from its designed or purposed power and function to restore to life—to requicken—the dead chief and lawgiver—in the person of a legally chosen cotribesman, and to heal and to soothe the wounded and bereaved mind of a cousin sisterhood of tribes—a cotribesman who shall live in the official name of the dead lawgiver. In Iroquoian polity the office never dies, only its bearer can die.

The institution of the ritual of the Condoling and Installation Council of the League of the Iroquois was an important one, and one essential to the maintenance of the integrity and efficiency of their state. The polity of the Iroquois as expressed in the ordinances of the League required that the number of chiefs constituting their federal council should be maintained undiminished in number. So to the orenda, or magic power, believed to be immanent in the words, the chants, and the acts of the ritual of the Condoling and Installation Council, did the statesmen and the ancients of the Iroquois peoples look for the conservation of their political integrity and welfare. So potent and so terrible—so full of orenda or magic power—are the matters comprised in the ritual of this great council that it is regarded as imperative to hold this Council of Condolence and Installation only in the autumn and winter. It is so deeply concerned with the dead and with the powers that requicken and preserve the living from the power of the Destroyer, and so it was thought to be deadly and destructive to growing seeds and plants and fruits were it held during the spring or summer—the period of growth and rebirth. Its purpose

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in part is to nullify and overcome the power of Death and to restore to its normal condition the orenda, or magic power, of the stricken sisterhood of tribes, whether of the father or the mother side. It was taught that the death of even one person weakened the orenda, or magic power, of the people, and so the death of a ruler was a greater blow; and to restore the life of the people the various institutions of the Condoling and Installation Council were devised to thwart the assaults of Death and to repair any injury done by it to the power of the people to live in health and peace.

In formal but highly redundant ritualistic phrases, the Requicken-
ing Address sets out in detail the evils and wounds which befall a stricken people—the calamitous effects of Death's power on the lives and the health and the welfare of the mourning sisterhood of tribes, and it asserts that it counteracts these evils and restores to life the dying people in the person of their newly installed chief.

It is sometimes delivered in the form of blank verse; but the text from which the following translation was made is not in such form.

This address is accompanied by fourteen strings of wampum. The orator delivers one of these wampum strings to the mourning side at the conclusion of every material statement. Hence, this address is also called the Fourteen Matters, and also *Ne' Adondak'sah* (i.e. The Wampum Strings of Requickening).

This is the form of the address as used by the father sisterhood of tribes—the Three Brothers. But by the substitution of "Four [originally Two] Brothers" instead of "Three Brothers", and "Fathers" instead of "Offspring" and the terms arising from this relationship, the form is then such as is used by the Mother or Offspring sisterhood of tribes.

THE REQUICKENING ADDRESS

The Orator says: "That this present day, such as this day is in kind, He the Finisher of our Faculties, He the Master, He the Sky-Holder [Te'horonⁿhiawā'k'hoⁿ], has made; He has prepared even the light of this day, such as it is, (I say).

"Now, moreover, the Three Brothers are following the ceremonial path [of the ritual], such as it was decreed by our grandfathers, upon whom our minds rested in confidence, when they prepared it for us, (I say).

"It is that, moreover, that brings their persons here, the calamity, so direful, that has stricken thy person, this one [*indicating*], thou whom I have been wont to hold in my bosom, thou noble one, thou the Four Brothers, (I say). It is that, moreover, this present day,

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that verily I now thrust aside the door-flap from the place where thou art sitting bent prone in grief, an object that is black, yea, from the place where thy back only is seen showing up out of the thick darkness, (I say).

"It is that, moreover, that I will stoop down there low, grasping my knees, and that moreover, I shall speak such words that I will soothe and appease by caresses thy guardian spirit, (I say).

"It is that, moreover, that I come for the sake of my offspring [i.e., the mother's side], (I say).

"It is that, moreover, that this present day we seat ourselves, thou and I, side by side, and that moreover, it is here in the very midst of many tears, (I say). And, moreover, the reason of it is, indeed, the direful thing that has befallen thy person, this one [*indicating*], my offspring, thou noble one, this one, thou whom I have been wont to hold in my bosom, (I say).

"That it is, moreover, that now it has caused to be vacant the mat, the place where he who was a coworker with thee, and upon whom rested the eyes of the wise minds, as was wont to be, (I say). That it is, moreover, that has caused it to be so, the being that is demonic in itself, the being that is faceless, the Great Destroyer, that it is, that every day and every night, roams about with its weapon couched, yea, uplifted at the very tops of our heads, wherein it and its kind desire it, and so they severally exclaim, 'I, I will destroy the Commonwealth [the League],' (I say).

"That it is, moreover, that it was there that it delivered a fine stroke whereby it snatched away one in whom thou didst trust for words of wisdom. And, now, in his turn, it has borne him away, it may be, indeed, to the place unknown. Now, then, this day thou hast thereby become one who abides in tears, (I say).

"Moreover, do thou, my offspring, this one [*indicating*], thou noble one, continue to think that now, it is, indeed, that the Three Brothers perfect their preparations. So let them now say, 'Now, we pass our hands through the tears (on thy face). We now wipe away the tears from these repeatedly, and for this purpose we use the benign skin of the spotted fawn.' Now, moreover, let them say, 'Now we have, indeed, wiped away the tears from thy face.' Now, moreover, thou shalt again keep looking about thyself in peace, enjoying the light of the day. Now, again, also, thou wilt see what is taking place on the earth, whereon is spread out the handiwork of the Perfector of our Faculties. Now, also, again thou wilt again see thy grandchildren as they move around beside thy person, even to the least of them, the infants. Now, thou wilt again see them all. Now, more-

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over, verily, thou wilt think in peace, this one [*indicating*], my offspring, thou noble one, this one, thou whom I have been wont to hold in my bosom, (I say). That thus, moreover, verily, also, for one poor day, thou couldst think in peace, (I say).

"In this manner, then, perhaps, shall they do it, the Three Brothers, so denominated ever since the time when they perfected the institution of their Commonwealth, (I say).

"Now, moreover, do thou know it, their word [wampum string] is on its way hence (to thee), (I say)."

SECOND WAMPUM STRING

"It is that, moreover, the direful thing that has befallen thy person, thou whom I have been wont to hold in my bosom, ye Four Brothers, (I say). We will say that it comes to pass where a calamitous thing has stricken a person, that usually the passages for hearing, the ears, become obstructed. And such a person then customarily hears nothing of the sounds made by the activities of men, nothing of what is taking place on the earth. Thus, moreover, this has befallen thy person, this one, my offspring, thou noble one, thou whom I have been wont to hold in my bosom. Indeed, there is nothing that surpasses the direfulness of what has befallen thy person. Now, thou dost not hear anything of the sounds made by men as they move about around thy person, nor anything of what is taking place on the earth. Now, therefore, let the Three Brothers say, 'Now, we have perfected our preparations, and so we have removed the several obstructions from the passages of thy ears.' So, now, moreover, thou wilt again hear when one will speak words to thee on whatever matter it may be, that may be directed to thee, thou noble one, my offspring, and also the many sounds made by thy nephews going about around thy person. Now, thou wilt hear all this, and also all that is taking place on the earth; all this thou wilt again hear. Now, also, thou shalt give good ear (to us) when we will speak to thee, (I say).

"It is that, moreover, that for one poor day thou canst think in peace, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, (I say).

"In this manner, then, perhaps, let them do it, the Three Brothers, so denominated ever since the time that they perfected their Commonwealth. Now, moreover, do thou know, this one, my offspring, thou noble one, thou whom I have been wont to hold in my bosom, that their word [wampum string] is on its way hence to thee, (I say)."

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THIRD WAMPUM STRING

"Now, another thing, (I say). That that customarily takes place where a distressful thing has befallen a person, that the flesh-body as to the throat becomes obstructed, and then, moreover, the powers of life usually are lessened. So it has thus befallen thee in thy person, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, (I say). Truly, indeed, has there not a very calamitous thing befallen thy person? Now, thy flesh-body as to the throat is obstructed; thou dost now breathe with difficulty and in distress; now, the powers of thy life are lessened greatly thereby. And, now, furthermore, let them say it, the Three Brothers, 'Now, we perfect our preparations, and we now remove the obstruction from thy flesh-body as to thy throat. Now, then, verily, thou wilt continue to breathe in peace. Now, the powers of thy life will regain their forces. Now, also, thou canst move thy body in peace. Now, also, thou canst speak in contentment when presently we, thou and I, shall greet one the other,' (I say).

"Thus, moreover, may it be, that for one poor day thou mayst also continue to think in peace of mind, this one [*indicating*], my offspring, thou noble one, this one, thou whom I have been wont to hold in my bosom, (I say).

"In this manner, then, perhaps, let them do it, the Three Brothers, so denominated ever since the time they perfected their Commonwealth, (I say).

"Now, moreover, do thou know it, thou noble one, my offspring, thou whom I have been wont to hold in my bosom, their word [*wampum string*] is going hence to thee, (I say)."

(These three acts of requickening are spoken and performed at the ceremony which takes place at the clearing or forest's edge adjacent to the lodge of assembly.)

The remaining eleven strings or skeins of wampum are used in the lodge of assembly, and only after several other rites have been performed by the celebrants.

FOURTH WAMPUM STRING

"Now, another thing, (I say). That it usually takes place where a distressful thing has befallen a person, that the flesh-body within itself is wrenched violently in succession, and so also is the mind twisted repeatedly. Now, moreover, usually this causes many yellow gall spots to affect the inside of the body. Now, moreover, the powers of life are usually lessened thereby. This occurs when the blow is

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merciless which causes the calamity to befall a person. Moreover, it has thus stricken thy person, this one [*indicating*], my offspring, thou noble one, this one, thou whom I have been wont to hold in my bosom. And truly, moreover, has not a most distressful thing befallen thy person? Now, at this very time, within thy body and also within thy mind, there is a continual wrenching and twisting. Now, nothing can be known of what is taking place within thy body. The thing that has befallen thy person is so direful that even now there are many yellow gall spots within it. And furthermore, our grandsires who have passed away made an ordinance when they said: 'Let us join together our affairs, and so let us ordain that the thing which we shall designate by the name of 'the soothing potion' (i.e., venison broth) shall be the dominant thing (in this matter).'

"And that in whatsoever place it may be that a direful thing may befall a person, it shall then be the duty of him whose mind is not so afflicted to make use of 'the soothing potion', and by taking up 'the soothing potion' he shall pour it into the throat of him upon whose person the calamity has fallen. And (it shall be) that when this 'soothing potion' shall have reached the inside of his body, it will work there, reorganizing all the many things which have become disarranged and disordered in his body and in his mind, and it will remove utterly all the yellow gall spots from his throat and from the inside of his body, (I say).

"Now, furthermore, do thou know it, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, that, now, the Three Brothers have perfected their preparations, and that now, verily, they take up the 'soothing potion' [venison broth], and now, furthermore, let them say it, 'We now pour the 'soothing potion' down thy throat; and that when it shall have reached fully the inside parts of thy body, it will come to pass that it will there take action, reorganizing, rearranging all the many things which are disordered within thy body and also in thy mind; and then all will be at ease, and also all the yellow spots will be removed therefrom, and then, moreover, all things pertaining to thy life will be in perfect order,' (I say).

"Thus, moreover, let it be that for one poor short day thou mayst think in peace, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, (I say).

"In this manner, then, it may be, let them do it, the Three Brothers, so denominated ever since they were in the prime growth of their affairs [career], (I say).

"Now, moreover, do thou know it, thou noble one, my offspring,

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thou whom I have been wont to hold in my bosom, that their word [wampum string] is on its way hence to thee, (I say)."

FIFTH WAMPUM STRING

"Now, another thing, (I say). That usually it comes to pass where a distressing thing has befallen a person, that his resting-place, that the mat of that person, is stained by a blood stream, and that that person wanders from place to place, and then sits cross-legged in wretchedness. This, furthermore, has indeed befallen thy person, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, (I say). Verily, indeed, hast thou not been brought low by what has befallen thy person, Now, at this moment, thy mat, thy couch, is marked wide by a stream of blood. At this moment, thou dost writhe in the midst of blood, (I say).

"Now, furthermore, do thou know it, the Three Brothers have perfected their preparations, and now, indeed, let them say it, 'now, moreover, we wipe away the blood-stains from thy mat. We, moreover, make use of the fine soft skin of the spotted fawn to wipe away the blood-stains.' It will, moreover, come to pass that on whatever future day that our minds shall be parted, one from the other, and, that when thou wilt return to thy mat, it will be in the fullness of peace, and it will be spread out in contentment, when thou wilt again sit cross-legged in thy resting-place, (I say).

"Thus, moreover, then, may it be, that for one poor short day thou mayst continue to think in contentment, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, (I say).

"In this manner, then, may it be, let them do, the Three Brothers, so denominated ever since they were in the prime growth of their affairs (career).

"Now, moreover, do thou know it, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, their word [wampum string] is going hence to thee, (I say)."

SIXTH WAMPUM STRING

"Now, another thing, (I say). That it comes to pass when a direful thing befalls a person, that thick darkness like a pall covers that person. Yea, that person becomes one who abides in great darkness. It so happens that that person knows no more the light of day upon the earth. It is, indeed, this very thing that has befallen thy person, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, (I say). Verily, indeed, hast thou

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not been brought low by what has befallen thy person. At this very moment thou art in great darkness. Now, thou dost not know the light of day upon the earth.

"Now, furthermore, do thou know it, the Three Brothers have perfected their preparations, and now, indeed, let them say it, 'We cause it to be day again for thee.' Now, the daylight will be fine, shining in perfect peace, and thou wilt again look upon the handiwork of the Perfector of our Faculties [Te'horoⁿ'hiawā'k'ho', the Man-Sky-Holder], spread out richly upon the earth.

"Thus, moreover, let it be, that for one poor short day thou mayst continue to think in contentment, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, (I say).

"In this manner, then, perhaps, let them do it, the Three Brothers, so denominated ever since they were in the prime growth of their affairs (career), (I say). Do thou know it, then, that their word [wampum string] is going hence to thee, (I say)."

SEVENTH WAMPUM STRING

"Now, another thing, (I say). That it comes to pass where a direful thing befalls a person, the sky, the firmament, becomes lost to that person, and that person knows nothing of what is taking place in the heavens. This very thing, moreover, has befallen thy person, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, (I say). Verily, hast thou not been brought low by what has befallen thy person? Now, furthermore, the sky is completely lost to thy mind. Thou knowest nothing of what is taking place in the sky, (I say).

"So, now, moreover, do thou know it, the Three Brothers are now perfecting their preparations, and now, indeed, let them say it, 'Now, we cause the sky to be again fine for thee, and it shall be beautiful, indeed, and now thou wilt continue to think in contentment when thou wilt look upon the sky.' It is a fact, indeed, that the Perfector of our Faculties, the Disposer of Things, the Sky-Holder, intended that that should be a source of contentment to the minds of men, (I say).

"Thus, moreover, let it be then, that for one poor short day, thou mayst continue to think in contentment, this one [*indicating*], my offspring, thou whom I have been wont to hold in my bosom, thou noble one, (I say).

"In this manner, then, perhaps, let them do it, the Three Brothers,

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so denominated ever since they were in the prime growth of their affairs, (I say). Now, furthermore, do thou know it, my offspring, now their word is going hence to thee, (I say)."

EIGHTH WAMPUM STRING

"Now, another thing, (I say). That it comes to pass where a direful thing befalls a person, that the Sun becomes lost to that person, customarily. Such a person. At such a time that person knows nothing about the Sun in its movements, nothing of its drawing near.

"This very thing, furthermore, has indeed befallen thy person, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom. Now, the Sun is lost to thee. Verily, moreover, hast thou not been brought low by what has befallen thy person. Thou knowest nothing of the movements of the Sun, nothing of its drawing nearer and nearer to thee, (I say).

"So, now, do thou, indeed, know this, that now the Three Brothers have perfected their preparations. And, now, furthermore, let them say: 'We now replace the Sun in the sky for thee.' And that indeed will come to pass when the time will come for the dawning of a new day, that, verily, thou wilt see it perfectly when the Sun will rise thence. Moreover, thy eyes will rest upon it as it draws nearer and nearer to thee. That, moreover, when the Sun will place itself in mid-sky then around thy body rays [or haloes] of light will abundantly appear. Then, indeed, thy mind will resume its wonted moods. Then, moreover, thou wilt again recall the many things, of whatsoever kind they may be, pertaining to the welfare of thy grandchildren, which are matters, indeed, in which thou hadst been laboring.

"Thus, moreover, let it be, that for one poor short day, thou mayst also continue to think in contentment, this one [*indicating*], my offspring, this one [*indicating*], thou noble one, thou whom I have been wont to hold in my bosom, (I say).

"In this manner, then, perhaps, let them do it, the Three Brothers, so denominated ever since they were in the prime growth of their affairs in the organization of the Commonwealth.

"Now, moreover, do thou know it, my offspring, thou noble one, their word [a wampum string] is going hence to thee, (I say)."

NINTH WAMPUM STRING

"Now, another thing, (I say). Now, more than this, the Three Brothers will put their hands to the place where the earth is upturn, in the direction of him, upon whom thou didst trust for words of

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wisdom and upon whom the eyes of those of great minds rested confidently.

"Now, more than this, do thou know it, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, that now, do not the Three Brothers perfect their preparations, and now, more than this, let them say it, 'We now level the upturned earth over the place where rests the one thou didst trust for words of wisdom.' And, more than this, a fine slab of wood do the Three Brothers place over it there, and also do they place fine mosses over it; for that, verily, that there are two things that are done by day and also by night; the one is that, should it so be that should it put forth fierce rays of sunlight, they shall not, indeed, pierce through to it; the other is, that should it so be that rains fall heavily upon it, that they too shall not penetrate through it to the place where he lies—though nothing save the bones be there. And, more than this, we now restore thy land to orderliness, and now the Three Brothers say, 'Now, we rush forward, throwing ourselves here and there, in that we may now gather together again thy bones, so widely scattered as they have been by the Being Malefic in Itself, the Being that is Faceless—the Being that is the Great Destroyer—Death,' (I say).

"More than this, (I say), that our departed grandsires made a ruling, in that they said that twenty (strings of wampum) shall be the value of this [i.e., a death by murder], at that price did they fix it, in that they denominated it by this: That it shall be worth (or valued at) twenty (strings of wampum); they declared that one shall bind their bones thereby [i.e., to keep them from being murdered by a clan or tribal enemy], (I say).

"Do thou know it, furthermore, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, that now, do not the Three Brothers take that up now, and that now, let them say it, 'Now, we bind thy bones one and all, setting the value of twenty (strings of wampum) on them,' (I say).

"Thus, furthermore, let it be (so), that for one poor short day thou mayst continue to think in contentment, this one [*indicating*], my offspring, thou noble one, thou whom I have been wont to hold in my bosom, (I say).

"In this manner, then, let it be, and let them do it, the Three Brothers, so denominated ever since they were in the prime growth of their affairs.

"Now, more than this, do thou know it, my offspring, that their word [wampum string] is going hence to thee, (I say)."

HEWITT—REQUICKENING ADDRESS

TENTH WAMPUM STRING

"Now, another thing, (I say). That our grandsires who are now dead and in whom our minds trusted, decreed, because they did not know its face, the face, indeed, of that Being that abuses us every day, that Being of Darkness lying hard by the lodges where it is black night, yea, that Being which here, at the very top of our heads, goes about with its couched weapon—with uplifted hatchet—eagerly muttering its fell purpose, 'I, I will destroy the whole matter—the Commonwealth,' they decreed, I say, that they would call it the Great Destroyer, the Being Without a Face, the Being Malefic in Itself [i.e., Death]. More than this it has done, putting forth its power there in thy frail booth of boughs, this one [*indicating*], my weanling, my offspring, thou noble one, and so snatched from there one on whom thou didst trust for words of wisdom and kindly service. And so now, at this very moment, there is in that booth a vacant mat because of this stroke. And, in striking this blow, it scattered the fire-brands widely asunder from the place where thou art wont to kindle thy fire, and now more than this, the Great Destroyer has trampled exultingly that place under foot.

"Thou sittest there now with bowed head; thou dost not meditate now on anything whatsoever of thy former affairs—wherein thou wast laboring for the two persons, thy niece and thy nephew, i.e., the men and the women of thy people, yea, for thy children; yea, for thy children, for this file of warriors, and this rank of women, and also for thy grandchildren, who run about at thy sides, and for these also who are still bound to the cradle-boards, and also for those children who are still unborn, whose faces, still under-ground, are coming towards thee. That is, indeed, the extent of the cares which were in the hands of him, thy mother's brother who has departed, as he labored for their daily welfare, and who is at this moment floating away far yonder, even as the crane flieth away.¹

"So, now, do thou know it, this one, my weanling, my offspring, thou noble one, that the Three Brothers have perfected their preparations, and now let them say it, 'Now, we gather together again the scattered fire-brands, and now, indeed, we re-kindle the fire for thee. And now, in fact, verily, the smoke shall again rise, and that smoke shall be fine, and it will even pierce the sky. So now again the eyes of the peoples—alien to us—shall again see the full number of our council fires. Now, indeed, again we raise thee up to full stature,

¹ Reference is made to the crane's legs.

HOLMES ANNIVERSARY VOLUME

and also cheer up thy mind. Now, more than this, we again set thee in order around the place where we have re-kindled the fire for thee.'

"Now, let the Three Brothers say it, 'Do thou again transact the business upon which thou wert hitherto engaged in promoting the welfare of the posterity of thy families [thy ohwachiras].'

"Thus, furthermore, let it be that for one poor short day, thou mayst continue to think in peace, this one, my offspring, thou noble one, my weanling.

"In this manner, then, let them do it, the Three Brothers, so denominated ever since they were in the prime growth of their affairs, (I say).

"Now, more than this, do thou know it, my offspring, my weanling, thou noble one, their word is now going hence to thee, (I say)."

ELEVENTH WAMPUM STRING

"Now, another thing, (I say). It is that wherein the Perfector of our Faculties who dwelleth in the sky, established it, in that he desired that he may have assistants even down to the earth; that these shall devote their care to the number of matters which pertain to the earth and which I have ordained, he says, one and all. It is that, in fact, that he caused the body of our mother—the woman—to be of great worth. He designed that she shall be entrusted with the several duties pertaining to the birth, the becoming, of men, and in the next place, that she shall circle around the fire in preparing food, that she shall have the care of that by which life shall be sustained and supported, and so the power to breathe is fortified. That also the warriors shall be her assistants, (I say).

"And that, too, is a calamity, that, it may be, the Great Destroyer will make a fine stroke there in the ranks of our mothers, that he will snatch away one there, and so her body shall fall. The evil is that a long file of persons will fall away, which, indeed, would have come in the many-fold lines of grandchildren who would have been born in the future from her. Moreover, her assistants, the warriors, just stand around listlessly, but grieving. And now that one, upon whom they so much depended, is now, indeed, very probably, floating away to the unknown (even as flieth away the crane). Now, more than this, the minds of all those who still remain have fallen, (I say).

"So now, furthermore, the Three Brothers have perfected their preparations, and, indeed, let them say it, 'Now, then, we raise up their minds again and cheer them up.' That, indeed, shall come to pass; they will now again devote themselves to their cares and their duties.

HEWITT—REQUICKENING ADDRESS

"That, more than this, (I say). Now, thou noble one, my offspring, my weanling, thou hast a nephew and a niece—the warriors and the women. They are thy care, (I say).

"That more than this, I say, thou noble one, my offspring, thou must give full hearing to whomsoever will speak to thee (for counsel and for service). That, too, let the Three Brothers say, 'Do ye listen and obey one another.' That it is, in fact, a grievous thing, should it be so that thou, thou noble one, would cast over thy shoulder whatsoever word is spoken to thee. That mood of mind can be only when the time is near in which the feet of thy people will hang over the abyss of the sundered earth (of impending ruin). And there is no one dwelling beneath the sky who has the power to come out therefrom when that will have come to pass. And, furthermore, this responsibility rests both upon thee and upon thy niece and thy nephew, that ye listen to and obey one another, (I say).

"Thus, too, let it be, that for one poor short day, thou mayst continue to think in contentment, my offspring, thou noble ruler, thou weanling, whom I have been wont to hold in my bosom.

"In this manner then, perhaps, let them do it, the Three Brothers, so denominated ever since they were in the prime growth of their affairs, (I say).

"Now, more than this, do thou know it, this one [*indicating*], my offspring, thou noble ruler, thou weanling, whom I have been wont to hold in my bosom, their word [a wampum string] is going hence to thee, (I say)."

TWELFTH WAMPUM STRING

"Now, another thing, I say. That, verily, it is a direful thing for the mind of him who has suffered from a grievous calamity to become insane, that, in fact, it is immune from everything on this earth, and has power to end the days of man, and that it may be caused by the falling away of the mind.

"That, more than this, do thou know it, my offspring, my weanling, whom I have been wont to hold in my bosom, that the Three Brothers have now perfected their preparations, and now, furthermore, let them say it, that 'We forbid thee in this matter. Let not the minds of thy people become insane from grief; let the matter, instead, remain in perfect peace,' (I say).

"Thus, furthermore, let it be that for one poor short day thou mayst continue to think in contentment and peace, this one, my offspring, thou noble ruler, my weanling whom I have been wont to hold in my bosom, (I say).

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"In this manner, then, may it be, let the Three Brothers, so denominated ever since they were in the prime of their affairs, do it. Now, more than this, do thou know it, my offspring, my weanling, their word is now going hence to thee, (I say)."

THIRTEENTH WAMPUM STRING

"Now, another thing, I say. That when our grandsires who have departed this life, conjoined their affairs, they decreed a matter, saying: 'Here we place two rods together, and therein, moreover, we have fixed a torch. We all, every one of our council fires, own it equally. And this, moreover, shall be one of the essential things wherever be the place in which a direful thing may occur, (I say). If so it be, that one will see what may cause them death, then that person shall take this torch, and that person shall indeed start at once through the lodge of the League, and in such manner shall he go that in the shortest possible time that person shall pass through the lodge of the League, and all [the council fires] shall have notice of the message. And, it shall be done in such manner that there shall be no traces—no 'forms'—of lying down on the path.' Now, more than this, the Three Brothers say, 'Now we again put the torch between the two poles, and we also now put back there the small pouch of wampum which we equally own,' (I say).

"Thus, furthermore, let it be, that for one poor short day, thou noble ruler, my offspring, my weanling, thou mayst continue to think in contentment.

"In this manner, then, perhaps, let them do it, the Three Brothers, so denominated while they were in the prime of their affairs.

"Now, furthermore, do thou know it, thou noble one, my offspring, their word [wampum string] is going hence to thee, (I say).

"These are the number of words, then, that the Three Brothers desired to address to thee, this one [*indicating*], my offspring, thou noble ruler, my weanling, whom I have been wont to hold in my bosom. Now, more than this, we Three Brothers do expect that all our words, thus addressed to thee, have come to pass, for thy peace and welfare."

FOURTEENTH WAMPUM STRING

"Now, another thing, I say. Thou must give good heed to the words I have spoken, this one [*indicating*], thou noble ruler, my offspring, my weanling, whom I have been wont to hold in my bosom. Now, I have again set in order all thy affairs. Now, furthermore, the Three Brothers see that the mat whereon thy coworker was wont to

HEWITT—REQUICKENING ADDRESS

rest has been caused to be vacant. That, moreover, they upon whom we depended for wisdom, in uniting their affairs, decreed, saying, 'It matters not, indeed, on which side of the fire there is a loss, it shall be possible that they shall again set his face fronting the people, that they shall again raise him up [requicken him], that they shall again name him, and that also he shall again stand in front of the people.' That, more than this, this one, my offspring, thou noble ruler, my weanling, the Three Brothers are on the ceremonial path.

"So, now, furthermore, let them say it, 'Now, do thou point out to us the one who shall be a colaborer with us.' Thus, now, this one, thou noble ruler, my offspring, my weanling, do thou know it. We Three Brothers have finished the matter [completed the ceremony].

"Now, then, lastly, that which gave us notice of this matter [the black wampum string, called tears] is going hence to thee.

"Do thou know it, also, my offspring, thou noble ruler, thou my weanling, that soon now the Three Brothers will arise to depart, and there, moreover, at the edge of the forest they will lay their pouches (for the night).

"There."

BUREAU OF AMERICAN ETHNOLOGY
WASHINGTON, D.C.

Certain Mounds in Haywood County, North Carolina

By GEORGE G. HEYE



EXPLORATION of the mounds herein considered was undertaken by the writer in the spring of 1915, in the interest of the Museum of the American Indian, Heye Foundation, of New York City.

The two mounds first examined are situated on the farms of James and Richard Plott, two miles southwest of Canton, Haywood county, North Carolina, and a short distance from the junction of the forks of Pigeon river. Originally a third mound was situated practically on the bank of Pigeon river, three hundred yards northwestward from the "Heye Expedition mound". (See pl. 1.)

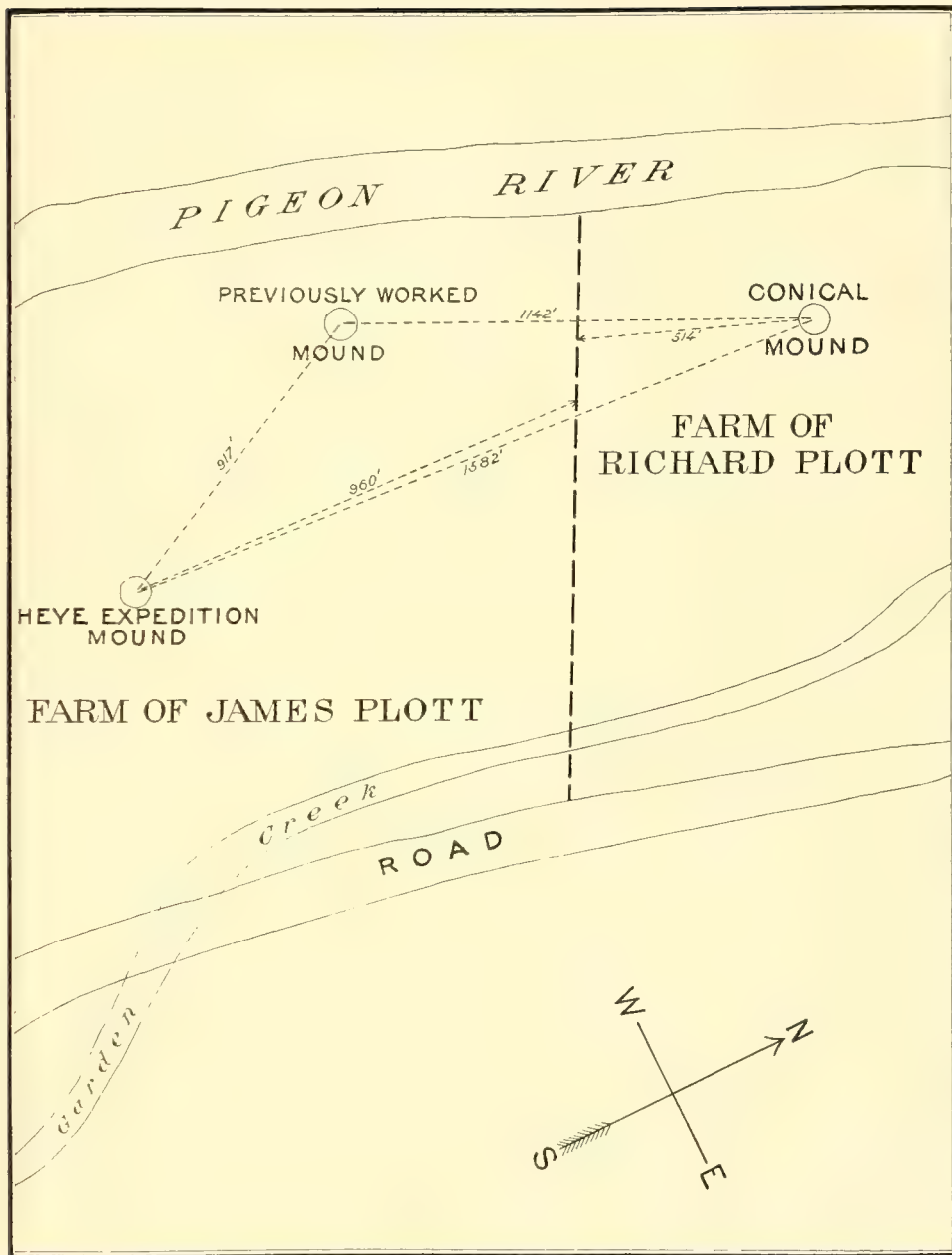
The mound last mentioned was the one excavated by our expedition; it is on the farm of James Plott and has an apple tree upon it (pl. II). The second mound referred to, on the farm of Richard Plott, also has an apple tree growing from its summit.

The third mound, that marked "previously worked" (pl. 1), was explored in 1880 by Mr Mann S. Valentine for the Valentine Museum of Richmond, Virginia. The only remaining evidence of the existence of this mound is a slight elevation. The situation of the earthwork in its relation to the others is shown on the sketch-map, plate I.

Near these mounds, and extending along the bank of the river for a distance of more than a quarter of a mile, is a stretch of ground the surface of which is six feet below the elevation of the land from which the mound rises, and which, owing to its sheltered position, would have been an ideal site for a camp. This plain is now flooded during spring freshets, and its earth is intermixed with sand, but every season many potsherds and stone implements are uncovered by the plow. The surface from the ridge of the mound to this lowland is covered thickly with similar fragmentary artifacts.

THE RICHARD PLOTT MOUND

The Richard Plott mound is conical in form and averages eighty feet in diameter by eighteen feet in height. On the sloping side of the mound many potsherds and broken chunkee stones of quartz were found. As before mentioned, in the center of the mound grows



MAP SHOWING THE LOCATION OF THE MOUNDS NEAR PIGEON RIVER,
NORTH CAROLINA

HEYER—NORTH CAROLINA MOUNDS

an old apple tree. Fifteen feet west of it lay the remains of a burial, consisting of many human bones and a shell bead that had been exposed by plowing. On the same site, but nearer the base of the mound, a deposit of charred acorns and nuts was discovered, and in several places masses of charcoal were seen. This superficial examination was made during a preliminary survey of the valley, when the presence of growing crops made excavation impracticable. During our sojourn the owner of this mound informed us that several human skeletons had been unearthed in plowing its surface.

THE JAMES PLOTT MOUND

The James Plott mound is of the conical type; it averaged sixty feet in diameter and was thirteen feet in height. On the crest stood the old apple tree, above referred to, thirty inches in diameter at the base. The roots still held the earth in place, and thereby preserved to some extent the height of the mound when the tree was planted. The difference between this point and the present general summit of the mound is about two feet (pl. II).

The work of excavation was commenced on the southwestern side, at a point forty-five feet from the center of the mound. Twelve inches below the surface a mass of stones was found, the uppermost of which were small river pebbles, but among them and underneath were heavy slabs which evidently came from the cliffs on the opposite side of Pigeon river. The owner of the mound stated that originally similar stones surrounded the base of the mound, but that he had removed many wagonloads of them. In a stratum of earth beneath this layer of stones many potsherds were found. This stratum averaged a foot in thickness and beneath it was undisturbed soil. Above the stones was a layer of black loam that evidently had been brought from the flats near the river, because no earth similar to it is found in the immediate vicinity. Six and one-half feet from the point where the layer of stones was first encountered the vertical section of a trench put down from the surface showed the stratification illustrated in plate III, *a*. Further excavation revealed the fact that the layer of stones commenced to dip in the center, and as the earth was removed toward that point this tendency became more pronounced until the center of the mound was reached. The stratification here is shown in plate III, *b*. After passing the center of the mound, the stratum of stones in the second half was found to be similar to that of the first half, and gradually flattened out to the opposite margin of the mound where it became straight. At no place there did the stone layer extend more than two feet below the surface of the mound, hence it was shown

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that when the mound was built, yellow sand and earth from the surrounding fields were piled in a circle, then covered with the stones, then in turn piled with the black loam.

On the base of the mound, slightly within the beginning of the stone layer, were artificial depressions that had been used as fire-pits. Seventeen of these were found, the largest of which was one foot in diameter and the smallest three inches, while their depth below the base ranged from four inches to two feet six inches. A table of these, with their contents, follows:

PITS IN THE FLOOR OF THE MOUND

No.	Diameter	Depth	Material Contained
1	12"	1'	Charcoal, mica; slab of mica on top.
2	10"	7"	Charcoal.
3	10"	4"	Charcoal and carbonized twigs, resting on which was a slab of mica, and in the mass a rough, unworked stone, a small irregular piece of burnt clay, and fragments of burnt bone.
4	3"	4"	Charcoal; mica on top.
5	8"	1' 3"	Charcoal; four small pieces of mica.
6	7½"	2' 6"	Filled with discolored earth and small pieces of charcoal, burnt deer-bone, potsherds, small pieces of flint.
7	9"	1' 11"	Discolored earth and charcoal.
8	6"	1' 3"	Filled with mixed earth and charcoal, with a piece of mica on top.
9	9"	1' 3"	Filled with mixed earth; charcoal.
10	10"	1' 8"	Filled with earth and charcoal containing animal bones and potsherd.
11	19"	1' 9"	Charcoal and earth mixed, and pieces of bone; large pieces of charcoal and small piece of mica on top.
12	6"	2' 1"	Ashes, burnt deer-bones, mica, potsherd, charcoal.
13	5½"	1' 1"	Mica, charcoal, and burnt animal bones.
14	7"	1' 3"	Charcoal, potsherds, burnt animal bones.
15	6"	1' 4"	Charcoal, potsherds, burnt animal bones.
16	6"	1' 3"	Charcoal, potsherds, mica.
17	7"	1' 7"	Charcoal.

Parts of seven human skeletons were found in the mound, all of them in a very fragmentary condition.

The first evidence of a skeleton was the tibia of a child, found three inches below the surface, where it had been turned up by the plow. The other bones of this skeleton were not found.



HEYE EXPEDITION MOUND ON THE FARM OF JAMES PLOTT

HEYER—NORTH CAROLINA MOUNDS

The next indication of human remains was part of a lower jaw, found near the surface, one of the condyles protruding from the soil. It was impossible to determine where the burial had been, as this fragment, like the one just mentioned, had been carried from its original position by the plow. James Plott, the owner of the mound, stated that he had not noticed human bones in his plowing, but there is no doubt that, owing to cultivation and to natural causes, the surface of the mound has been greatly reduced and that many burials have been upturned and the bones scattered.

Directly west of the center of the mound a stone grave was found, one of the upright stones of which protruded slightly above the surface (pl. iv). The grave measured six feet eleven inches in length by three feet three inches in width. It was directed north and south, the rounded or head end being toward the latter point. The stones forming the sides of the grave were roughly shaped, the ends that extended downward into the ground being tapered. The sides and northern end of the grave were so placed that the stones touched, while those forming the semicircle at the head were set slightly apart. The bottom, or floor, was formed of two layers of large flat water-worn stones. In the lower layer, near the center of the grave, a large thick potsherd was found, and near it a piece of mica.

The stones that covered the grave had been placed on the earth which filled it, and did not rest on the upright side or end stones. The stones that lined the bottom of the grave rested on a stratum of yellow river sand.

The only part of a skeleton found in this grave was a fragment of skull. Three feet east of the grave the femora were found, but no other parts of the burial were visible. Aside from the potsherd and the piece of mica already mentioned, nothing was found with the remains. From the condition of the grave, and because the leg-bones were found beyond its limits, it is probable that this interment had been opened either by early settlers in the region or had been despoiled by the Cherokee or by other Indians who occupied the region after the departure of the original inhabitants.

The fourth burial was represented by a fragment of the skull of an adult, found seven feet beneath the surface. Not far from this fragment another was found, resting at about the same level, and beneath it was a layer of water-worn pebbles. Near the second fragment of cranium a portion of the pelvis and particles of the femora were found. No other bones were in evidence, and those mentioned were greatly decayed. The general direction of the disturbed earth was east and west, which was probably the trend of the grave, in

HOLMES ANNIVERSARY VOLUME

which case the head was directed toward the west. Near the lower part of the left femur a lignite celt was found; it is in perfect condition and the blade-end is sharp. This implement measures five-eighths of an inch in thickness by one and seven-eighths in width at the blunt end, and three inches at the blade end; its greatest length is four and a quarter inches. The poll-end shows the process of manufacture by rubbing similar to that exhibited by some of the jadeite celts from Alaska. Nothing else was found with this burial.

The fifth burial found was represented by a fragmentary skull, a portion of the lower jaw, and parts of the upper cervical vertebræ. This skeleton, which was that of an adolescent, lay eighteen inches beneath the surface. Nothing was found with it. Not far from these bones were two leg-bones, in fragments, resting at about the same depth and probably belonging to the same skeleton.

The next burial, consisting of the arm and leg-bones, portions of the pelvis, and a few other fragments, was found one foot beneath the surface. From the massed condition of these bones it was evident that this burial was of the "bundle" type.

The seventh burial found was that of a child, the only remaining portions of which were fragments of the skull, which lay eighteen inches below the surface. Accompanying this burial were an arrow-point and a piece of mica.

Besides the above skeletal remains a few scattered fragments of human bones were found during the excavation.

After removing the apple tree from the center of the mound, in and under the roots extending to a depth of about two feet was a stratum of river sand. Six inches below this sand deposit were two large sheets of mica, each about three-eighths of an inch in thickness, which rested upon a circular disc of bitumen four inches in diameter by an inch and a half in thickness. Beneath this bitumen object were three layers consisting respectively of red ochre, white clay, and yellow ochre. These layers, each averaging an inch in thickness, extended entirely across the pit, which was twelve inches in diameter. Next in order in the pit were burnt bones and ashes, among which were found two potsherds and two fossil shark's teeth showing artificial working at the edge. The pit was about ten inches deep, and at its bottom was a flint nodule weighing about thirty pounds, a material not known to any of the neighboring land-owners as occurring *in situ* in this section.

During the remaining excavation of the mound comparatively few potsherds were found; these are all small and show only incised decoration. Several short, knob-like legs of jars show that the pottery



a. SECTION OF THE HEYE EXPEDITION MOUND, SHOWING STRATIFICATION
b. STRATUM OF STONES NEAR THE CENTER OF THE HEYE EXPEDITION MOUND

HEYE—NORTH CAROLINA MOUNDS

is of Cherokee ware. There are also several bottoms of jars, of the pointed type, but with the exception of nineteen arrowpoints and a crude hammerstone, no implements were found.

As all the burials were found near the surface and on the upper side of the stratum of stone, it is evident that they were intrusive and that the mound was not designed for mortuary purposes. It is therefore possible that it was used by the Cherokee in playing their ball game. The situation of the two mounds indicates that they could have been used to mark the limits of the ball-field or to have been used otherwise in connection with the game of ball.

Mooney¹ says:

Kănúga—An ancient Cherokee town on Pigeon river, in the present Haywood county, North Carolina. It was deserted before the beginning of the historic period, but may have been located about the junction of the two forks of Pigeon river, a few miles east of Waynesville, where there are still a number of mounds and ancient cemeteries extending for some miles down the stream. Being a frontier town, it was probably abandoned early on account of its exposed position. The name, signifying "scratcher," is applied to a comb, used for scratching the ballplayers, and is connected with *kanŭgŭ''la*, or *nugŭ''lă*, a blackberry bush or brier.

THE SECOND JAMES PLOTT MOUND

The second mound on the James Plott farm is now a low, elongated knoll. As above stated, this mound was explored and partly leveled by members of the Valentine Museum expedition in 1880. According to old residents who were familiar with the mound before it was disturbed, it was similar in size and shape to the others of this group, except that the top was more flattened.

SINGLETON MOUND

Between Canton and Waynesville, about two miles southwest of the Plott mounds, on the property of Mr T. D. Singleton, at Bethel, Pigeon township, Haywood county, was a small, low, circular mound. This mound averaged twenty feet in diameter and from a foot to two feet above the general surface. Being situated in Mr Singleton's front dooryard, it had been used as a flower-bed. At one time two large trees stood on the mound, but they were removed by the present owner of the place, who informed us that they were between sixty to eighty years old.

The work of excavation was commenced on the roadside of the earthwork. In the southern part several potsherds and a pitted hammerstone were found, and in the center an earthenware jar, which

¹James Mooney, *Myths of the Cherokee*, *Nineteenth Ann. Rep. Bur. Amer. Ethnol.*, p. 479.

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stood upright but was somewhat crushed, although the base and portions of the side were in place. This vessel is of the pointed-bottom type and has two crude nodes projecting from the rim for handles (pl. v). The decoration is of the incised and punctate type, and consists of three panels, in each of which is an ornamental figure. The diameter of the jar at the mouth is $5\frac{1}{4}$ inches, the maximum width is $6\frac{1}{2}$ inches, and its height $8\frac{1}{4}$ inches. Nothing else was found in the mound.

The Singleton mound was composed of earth and showed no stratification. Particles of charcoal were scattered here and there, but there were no charcoal deposits such as were found in the Plott mound. The mound earth extended to the natural clay surface, which was four feet below the summit of the earthwork at the center.

SCATTERED ARTIFACTS

During the writer's sojourn in Haywood county he was fortunate enough to collect a number of artifacts that had been found on the surface, including a variety of steatite ornaments, most of which are drilled for suspension. Steatite pipes were seemingly numerous and range from the small trade-pipe form to the large and massive L-shaped variety ornamented with carving.

Celts were not common in this neighborhood, and only one grooved ax was obtained. A large number of small discs of steatite and other stone were collected, but comparatively few arrowpoints were gathered.

MUSEUM OF THE AMERICAN INDIAN, HEYE FOUNDATION
NEW YORK CITY



STONE GRAVE IN THE HEYE EXPEDITION MOUND



POTTERY VESSEL FROM THE SINGLETON MOUND

The Origin and Destruction of a National Indian Portrait Gallery

By F. W. HODGE



LITTLE less than a century has passed since Thomas Loraine McKenney, a merchant in Georgetown, District of Columbia, entered on his duties as United States Superintendent of Indian Trade, April 12, 1816, succeeding General John Mason. At that time every Indian tribe within the domain of the United States was regarded as a distinct sovereign power with which, when occasion arose, the United States entered into solemn treaty, and the chief interest which the Government manifested in the various tribes was for the maintenance of peace and the promotion and regulation of trade. As early as 1776 the Congress of the Confederation enacted a law for granting licenses and regulating trade among the Indians; but it was not until ten years later that the United States entered into regular trade relations with the tribes by establishing trading-posts on the frontier and providing for the appointment of a Superintendent of Indian Trade. It was to this office that McKenney was called by President Madison in 1816, and to which he was reappointed by President Monroe in 1820. The position was one of trust and of great responsibility, involving the expenditure of large sums of money for purposes of trade as well as for the distribution of annuities. This trade was conducted under McKenney's superintendency for six years; but the large private fur companies meanwhile steadily increased their own traffic by the introduction of spirituous liquors, until finally, by Act of Congress of May 6, 1822, the Government trade was brought to an end and George Graham was appointed to close the affairs of the Superintendency.

Being just and humane, McKenney had not long been conducting the affairs of his office before realizing the condition of the Indians as a result of the evil influences of civilization. In 1818 or 1819 he addressed a circular to those friendly to the Indian cause, in an endeavor to rescue them "from the sad condition in which they were everywhere known to be," and as a result of this appeal Congress in 1819 appropriated \$10,000 "for the civilization of the Indian tribes adjoining the frontier settlements."

HOLMES ANNIVERSARY VOLUME

After being legislated out of office in 1822, McKenney established a newspaper which he conducted for nearly two years, when, in recognition of the confidence reposed in him by President Monroe and the Secretary of War, John C. Calhoun, McKenney was assigned to "the duties of the Bureau of Indian Affairs," at that time under the control of the War Department. The office was not created at this time by Act of Congress, but was organized by the Secretary of War, with the approval of the President, for the better administration of Indian affairs. McKenney declined the appointment at first because the compensation offered (\$1,600) was inadequate to his support, but as the Secretary of War promised that the President would recommend to Congress the organization of an Indian department with a salary commensurate with the importance of the office, McKenney consented to accept, and on March 11, 1824, he was assigned the duties of the new bureau. However, from treaties negotiated at Washington in the same year in which McKenney appeared only as a witness, his official authority probably was not very great. But there is no doubt that McKenney's interest in the Indians increased as time went on, for in 1825 he joined Dr C. S. Rafinesque in drafting a circular letter asking information respecting the languages of the tribes, while his official labors were so oppressive and the responsibilities so weighty that his health succumbed to the pressure, and had it not been for the confidence of the President and of the Secretary of War, "I should, in all probability," says McKenney, "have died at my post." In June, 1826, McKenney started from Georgetown on a journey to Lake Superior for the purpose of negotiating, jointly with Lewis Cass (later Secretary of War), a treaty with the Chippewa Indians at Fond du Lac, for whom, at that time, the afterward celebrated Henry R. Schoolcraft was agent.

In addition to the successful negotiations of this treaty on August 5, 1826, a result of this journey was a series of letters published at Baltimore in 1827 under the title *Sketches of a Tour to the Lakes*, etc., illustrated with twenty-nine engravings from paintings by James Otto Lewis, of Detroit, of which the least said the better.

Meanwhile, during McKenney's incumbency, namely, on December 15, 1824, Lewis Cass, then Governor and Superintendent of Indian Affairs of Michigan Territory, addressed Secretary Calhoun as follows:

I do myself the honour to transmit you a striking likeness of the celebrated Shawnese prophet, the brother and coadjutor of Tecumseh, painted by Mr Lewis, a young artist of this town.

It has occurred to me, that you might not deem it improper to direct portraits to be taken of the most distinguished Chiefs, who visit this place, and for-



"NAU-CHE-NING-GA, OR NO HEART," AN IOWA. PAINTED BY KING IN 1837
(United States National Museum)

HODGE—INDIAN PORTRAIT GALLERY

warded to be deposited in the War Office. Mr Lewis sketches admirable likenesses in water colours upon paper for about five dollars, and an expenditure of \$200 would accomplish the whole object. In a national point of view, it cannot be unimportant to form a gallery of portraits of our most distinguished aborigines, who [are] rapidly passing away, and will ere long disappear.¹

Living in Detroit, Cass was familiar with Lewis's work, for both were present at the treaty of Prairie du Chien in August, 1825, and it is evident that the artist received every encouragement from the statesman, for we find them together at various other treaties in 1826 and 1827.

That the suggestion of Cass met with sympathetic interest on the part of Calhoun and McKenney is attested by the fact that three weeks after Cass wrote from Detroit, an order for sixteen Indian portraits was given by McKenney, who stated in his response to Cass that "it is desirable for the size of the portraits to be enlarged so as to measure 17½ inches one way and 14 the other, to match those which have already been taken of chiefs in this city." It is thus seen that while Cass manifested interest and lent his aid in the matter, McKenney had already been the inspiration of the effort; indeed he mentions in his *Memoirs* that Indian portraits adorned the walls of his office. But we have no direct information respecting the individuals whose portraits were thus painted by Lewis, although there is no question that at least thirteen pictures, mostly of members of a Creek delegation, were painted at Washington by Charles Bird King in 1825, the year in which the order was given. King had been a pupil of Benjamin West in London for four years.

There is direct evidence that McKenney had interested himself in the plan of portraying the features and costumes of Indians as early as 1821, for in that year King painted an Oto portrait (no doubt one of those which hung in McKenney's office in Georgetown), which later found its way to the Indian Gallery of the War Department, and in 1824 the portrait of an Iowa Indian was painted by him—these, with the painting of the Shawnee Prophet by Lewis in 1823, which Cass sent to Washington in December of the following year, may be regarded as the very nucleus of the collection, although it must be said that there is no information respecting the dates of many of the paintings comprising the Gallery, which possibly, during its incipency, may have been made up of others than those mentioned.

That McKenney was the chief spirit in the formation and growth of the Gallery, and indeed in its very inception, is gleaned also from

¹ Original letter in the Office of Indian Affairs.

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a letter from James Barbour, who succeeded Calhoun as Secretary of War on March 7, 1825, three months after the first order for Indian portraits was made, for Barbour wrote in 1832 that McKenney himself had suggested "the expediency of preserving the likenesses of some of the most distinguished among this most extraordinary race of people. Believing, as I did, that this race was about to become extinct, and that a faithful resemblance of the most remarkable among them would be full of interest in after times, I cordially approved of the measure. This duty was assigned to Mr King, of Washington, an artist of acknowledged reputation; he executed it with fidelity and success, by producing the most *exact* resemblances, including the costume of each."

We have already referred to the journey of McKenney and Cass for the purpose of negotiating the Chippewa treaty at Fond du Lac in August, 1826. It was then that the artist Lewis took further incidental part in the establishment of an Indian portrait gallery, for during his association with the treaty commissioners he painted numerous portraits, as well as a few scenes from Indian life, some of which, as mentioned before, were crudely reproduced as illustrations of McKenney's *Sketches of a Tour to the Lakes*. What became of the original paintings or drawings by Lewis, of which there were at least eighty-five, has not been determined, but seventy-two of them were used in illustrating an *Aboriginal Port-Folio* published by the artist in 1835, and King made copies of at least twenty-five of the principal originals for the Indian Gallery in 1826 and 1827, while an artist named A. Ford made six others for the same purpose in 1826. In his *Aboriginal Port-Folio* Lewis states that he "had the honor to be employed by the Indian Department expressly for the purpose" of making the portraits, adding: "As regards the merits of their general character, and the fidelity of the costume, he can with confidence assure the public, that the resemblances of both are faithfully and accurately given." If we may judge by the hand-colored reproductions in the artist's *Port-Folio*, however, his work was hardly worthy of such laudation. Commenting on these illustrations, Schoolcraft, writing in 1836, said: "He [Lewis] has painted the Indian lineaments on the spot, and is entitled to patronage—not as supplying all that is desirable and practicable perhaps, but as a first and original effort."

In addition to his original portraits of members of visiting deputations of Indians to Washington, and the copies made from Lewis's paintings or drawings, King evidently continued industriously with brush and palette, with slight intermissions, until 1837, while the

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Gallery received additions also as a result of the work of A. Ford, above mentioned, S. M. Charles, G. Cooke, Shaw, and an artist who signed the initials R. T. But it was between 1825 and 1827 that the collection received its principal growth, fifty-seven portraits having been added in those years so far as the record shows, but it may be said that only ninety of the entire collection of one hundred and forty-seven paintings were dated. In 1828 only two portraits were added; in 1829, one, and in 1830, the year of McKenney's dismissal owing to the machinations of strong political enemies, one other.¹ The Gallery received no further accessions until 1835, neither McKenney's successor nor the other officials of Jackson's administration evidently caring to stoop to such trifles as Indian portraits; but in 1835 three new pictures were placed in the collection, and in 1837 it received its final accession of twenty-four portraits by King and Cooke. In this year Joel R. Poinsett was Secretary of War and C. A. Harris in charge of the Office of Indian Affairs.

Before his dismissal from office in 1830, McKenney had already anticipated the publication of an elaborate work on the Indian tribes, illustrated with the portraits in the National collection, for we find him in Philadelphia in that year, negotiating with Samuel F. Bradford for its publication; but these negotiations were not consummated.

¹ A "Letter from Thomas L. McKenney, Esq., Superintendent of Indian Affairs, to his friend in Baltimore, dated Georgetown, May 15, 1828," sheds some interesting information respecting the origin and cost of the portraits in the Indian Gallery. The letter, published in the *National Intelligencer* of Washington city, reads in part as follows:

"The price paid to Messrs King and Ford for taking Indian likenesses, with the view of preserving the exterior and appearance of these hapless People, and their costume, etc., is, for each head and about half the body, \$20. In full lengths, more, of course, has been given. The average cost of this collection, since 1821, is perhaps \$3,000 for *one hundred and sixteen heads*, and the cost for each head, including the full length likenesses, of which latter there are five, is about \$33.

"Apart from the great object of preserving in some form, the resemblances of an interesting People, whose original aspect is fast fading away, and will soon be gone; and to whose country we have succeeded, and who are perishing before our presence, and *because of it*; there is another, if of less interest, yet, perhaps of more active influence, and can be seen to be proper by more people, it is presumed, than can comprehend the value to posterity, of being ready with the answer to the question, which it is fair to presume will be asked: '*What sort of a being was the red man of America?*' It is the policy of the thing. Indians are like other people in many respects—and are not less sensible than we are, to marks of respect and attention. It is known to you, I presume, that deputations come on to Washington frequently, on business of deep interest to their tribes and to the United States. They see this mark of respect to their people, and respect it. Its effects, as is known to me, are, in this view of the subject, highly valuable. But it may not be for me to justify this branch of national policy. I am quite content, anyway. If the Congress, who represent the People, whose servants we are, think it right to do so, this collection can be sold, at any moment, for double its original cost. And with it may go, without any regret of mine, of a personal kind, all the little relics which, in my travels, I have picked up, and at great trouble brought home with me. It is no fancy scheme of mine. It was begun by one [evidently John C. Calhoun] who is more enlightened than I profess to be, and continued by another [James Barbour] who is also highly qualified to judge of the fitness of the thing, and of whom no man, who knows him, can feel else than respect and friendship. I will just add, that our own citizens who visit Washington, and those who visit it from other countries, unite in commending this grouping of our Indians from the four corners of our land, as an affair of great interest, and which posterity will be thankful for."

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About 1834 he enlisted the services of Judge James Hall of Cincinnati, a literary man of note in his day, and after much labor and many delays, as well as an unsuccessful effort on the part of Hall to interest George Catlin in the enterprise, the first of the three folio volumes of McKenney and Hall's *History of the Indian Tribes of North America* appeared, with the imprint of Key and Biddle, of Philadelphia, in 1836, a year after the publication of the miserable *Aboriginal Port-Folio* by Lewis. This elaborate and expensive work (volume II of which was published in 1838 and volume III in 1844) has an important bearing on the Indian Gallery, as in it are preserved the reproductions of one hundred and twenty paintings, nearly all portraits, and all but very few engraved from copies of the pictures in the Government collection. These copies, in oil, were made by Henry Inman, who commenced the task probably in 1832, having removed from New York to Philadelphia, where he established a studio for the purpose; but how the original paintings were sent from Washington to Philadelphia we are not informed, nor is there any evidence that Inman lived in Washington for the purpose of making the copies. In 1836, one hundred and three of the engravings, together with the Inman copies of the portraits, were exhibited at the Masonic Hall in Philadelphia, where they attracted great attention. The Inman copies subsequently came into the possession of a Boston family in partial payment of a debt contracted by the publishers of McKenney and Hall's work for printing paper, and subsequently were presented to the Peabody Museum at Cambridge, where they are now preserved.

We have seen that the final additions to the Indian Gallery were made in 1837. In 1841 the collection was deposited in the museum of the National Institute in the Patent Office building, where they remained until 1858, when they were transferred to the Smithsonian Institution, four years before the expiration of the National Institute's charter.

A few years earlier, namely, in 1846, an effort was made to purchase the collection of Indian pictures painted by George Catlin, but this was not done, and in 1852 a part of them passed into the possession of Joseph Harrison, Jr, of Philadelphia, and in 1879 were presented by his widow to the National Museum.

An important addition to the National collection of Indian pictures was made in 1852 by the deposit of one hundred and fifty-one canvases painted by J. M. Stanley among forty-three tribes during the previous ten years. As in the case of the Catlin collection, an effort was made to obtain an appropriation by Congress for the purchase of the Stanley paintings, but appeals were in vain. The collec-



"JACKOPA, THE SIX," CHIPPEWA. PAINTED IN 1827



"ESSNEBOIN" ("ASSINIBOIN"), CHIPPEWA CHIEF.
PAINTED IN 1827

Portraits by King after Drawings by J. O. Lewis. (United States National Museum)

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tion remained in the Smithsonian Institution continuously, except for temporary removals for exhibition elsewhere, the artist owner augmenting it from time to time with portraits of individuals belonging to Indian deputations which visited Washington, until by the beginning of 1865 it numbered about two hundred paintings, nearly all of life size. In 1859, Stanley, apparently ever hopeful that Congress would listen to Secretary Henry's appeal, asked the Smithsonian Institution for an allowance of \$100 a year to meet the interest on a debt he had incurred to prevent the sacrifice of his paintings by sale. Such is the pitiful story of his poverty while yet the owner of a collection of paintings then valued at \$20,000, but which, did they exist today, would be well-nigh priceless. In 1858 Henry wrote that the Indian paintings deposited with the Smithsonian Institution, then numbering probably three hundred and fifty canvases, "form perhaps the most valuable collection in existence of illustrations of the features, costumes, and habits of the aborigines of this country. This gallery is an object of special interest to all visitors to the national metropolis, and to none more so than to the deputations of Indians frequently called to Washington to transact business with the Government."

And now comes the final word on the National Indian Gallery. On January 15, 1865, a serious fire destroyed a part of the Smithsonian building as well as the entire collection of Indian paintings with the exception of a few by Stanley which hung in another part of the building, and a few by King.

King died at Washington in 1862, and thus never knew the fate that befell the original Indian Gallery. Stanley returned to his home in Detroit probably as early as 1863, where he pursued his art until his death in 1872. King bequeathed to the Redwood Library of Newport, Rhode Island, his native city, a collection of twenty-one Indian portraits, sixteen of which are replicas of contemporary pictures reproduced in McKenney and Hall's work. In addition two are in the University Museum at Philadelphia, three in the National Museum (pl. I, II), and a few others have made their appearance from time to time, and after passing through the hands of booksellers or by way of the auction mart have found resting-places, it is hoped, in permanent depositories.

BUREAU OF AMERICAN ETHNOLOGY
WASHINGTON, D.C.

Experimental Work in American Archeology and Ethnology

By WALTER HOUGH



THE classification and description of human artifacts has always been an important work of archeologists and ethnologists. The description of material has also laid stress on structure, an inclusive term, and whatever might be known or conjectured as to function. A third inquiry must often have suggested itself to students—that of the process of manufacture, but the pursuit of this investigation remained in abeyance until a few decades ago. The spirit of inquiry which exerted itself powerfully under the influence of the Smithsonian Institution and a few other scientific nuclei brought about a little more than a generation ago a revolution of anthropological methods. Historically this revolution began with Charles Rau, who took up the archeological work of the Smithsonian Institution in 1875. An examination of Dr Rau's writings, which were the most weighty that had appeared in America, will show that he drew upon the resources both of archeology and ethnology for his determinations of ancient material, and that he gave importance to technology. About 1876 there were in Washington, associated with the Smithsonian Institution and the Geological Surveys, a number of young scientific students whose minds were not hampered with outworn traditions. American archeology was just entering a new phase; the leaven of investigation was working in the minds of the coming American archeologists. Rau had demonstrated the drilling of stone without metal in 1868, and this appears to be the preliminary effort at American aboriginal technology. The full statement of the subject in its wider manifestations, however, is found in the introduction to Holmes' "Art in Shell," in the Second Annual Report of the Bureau of American Ethnology, 1880-81, which shows the broad scope with which Holmes presented the necessity for the study of prehistoric arts and industries. He says (page 188): "The slightest modifications of these relics by the hand of man attracts our attention, and from that infant stage of the art until the highest and most elaborate forms are reached they have the deepest interest to the student of human progress." Holmes' plate xxxix depicts the manufacture of shell implements and orna-



CLIFF-DWELLING AND TOWER ON THE RIO MANCOS, COLORADO, FROM
A WATER-COLOR SKETCH BY W. H. HOLMES IN 1875

HOUGH—EXPERIMENTAL WORK

ments, and the whole work is replete with examples of the author's acumen as to aboriginal technology. The continuation of this work to the present day has aided greatly in clarifying American archeology and has given a stimulus and added interest to the science. The work of the school of American archeologists and ethnologists of which Holmes is a pioneer put an end to the futile efforts of the old school of anthropologists who sought to generalize without adequate observation and wholly without experiment. The records of earlier observers were interesting, but generally woefully incomplete, and the writings on the whole may now be regarded as belonging to the mythical age of anthropology whose fancies and inexactness long kept the science in America in what was little better than disrepute. The course of investigation which Holmes outlined and forced home by precept and example was taken up by Mason, Cushing, McGuire, and a few others who formed the school of American anthropologists which has left a profound impression on the science. These men were foremost in the field, they were pioneers of aboriginal American technology. They saw beyond dead artifacts some portions of the story of the development of the arts and sciences, the beginnings of the conquest of the mighty forces that are at the command of the men of the present day. No romance is more fascinating than that recorded in the story of the steps by which great industries arose from humble beginnings, and no pursuit is more enthralling than the tracing of this history whose educational and scientific value are beyond computation. These men saw the nexus between archeology and ethnology; they believed it unscientific to limit any branch of the great field of research to the activities classified directly under its name. They saw that science is an organic whole, each unit of which sweeps from nebula to life and is dependent upon and mutually helpful to all other units.

They also realized in some measure as unscientific the tendency to enwrap in mystery the artifacts of man which are separated from the present merely by lapse of time. In this respect there has been great need for scientific soundness and conservation of research, qualities which are preëminent in Holmes. For a number of years the branch of ethnology has gradually confined its activities to culture history of existent peoples. Archeology, however, has increased in importance and may be said to rank with ethnology, the distinctions in America being almost lacking. Material culture unites the two branches of anthropology, which have always been strengthened whenever the resources of each were employed. Archeology and ethnology, so far as America is concerned, are handmaids and work together upon the basal problems of human activities.

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It was the belief of this school that one could not describe an artifact with clearness until he knew how it was made. Mason carried out the idea consistently in the monumental works that he produced on aboriginal industries. The writer remembers with gratitude that Professor Mason urged him to become familiar to the last degree with the methods of fire-making before undertaking in 1888 the publication of descriptions of fire-making apparatus in the United States National Museum. "Knowledge at first hand" was his maxim, and those who profited by his instruction bear witness to its value. It was a privilege beyond estimation to have been connected with the older school of American aboriginal technic, of which Holmes was preëminent, and to have shared in its labors. Some years ago an attempt was made to correlate the so-called paleoliths of European archeology with specimens of almost indetical forms found in America. The matter provoked considerable discussion and was apparently about to divide American archeologists into two camps when Holmes definitely cleared the air by demonstrating that these objects were rejects or wastage of the process of making arrowheads and leaf-shape knives.

This epochal generalization grew out of a study of the workshop materials in a quartzite boulder deposit on Piney branch, within the limits of the city of Washington. Here De Lancey Gill discovered, about 1880, traces of chipped stone on the banks of the stream. Later, in 1889, Professor Holmes explored the neighborhood of the spot and found a quarry workshop of great extent containing a tremendous quantity of rejectage. In this mass appeared innumerable "paleoliths". By examination and experiment Holmes found that these anomalous objects represented the first steps pursued by the aborigines of the District of Columbia in reducing quartzite boulders to the thin leaf-shape blades desired for fashioning into knives and arrowheads by subsequent chipping or shaping at leisure at their villages. Holmes further demonstrated that the stone-worker held a boulder in the left hand and struck off flakes around the periphery by means of another boulder held in the right hand. If the stone fractured evenly, clearing the side of superfluous material and leaving none of the original worn surface of the boulder, the stone was turned and the process repeated, the result being a leaf-shape blank ready for further fashioning. A study of the considerable rejectage due to accident in working or lack of quality in the stone brought to light specimens illustrating most fully all the steps from the natural boulder to the terminal blade broken perhaps at the last by an unlucky blow. Following the lead of the quarry work, Holmes traced

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the quartzite objects to the village-sites, completing the series with the finished arrowheads and knives. His memoir on "Stone Implements of the Potomac-Chesapeake Tidewater Province" in the Fifteenth Annual Report of the Bureau of American Ethnology shows the fruition of Holmes' methods of technic here embracing the knife, arrow, drill, and scraper, in various materials; the series of battered and abraded stone implements, as the celt and stone ax, pestles, mullers, "ceremonials", etc.; and incised or cut-work soapstone utensils, as vessels, pipes, etc.

The idea of the elucidation of ancient aboriginal technology, "the natural history method" as Mason termed it, is ever present in Holmes' writings. It is the common sense of the science of culture history.

The desire for explicit statement and exactness of seeing, which is the first qualification of an artist and a powerful adjunct to the work of a scientific man, is remarkably brought out in the scientific methods of Holmes. The first white man who ever recorded his impressions of a cliff-dwelling, we can imagine his enthusiasm as with eager pencil he put upon paper the facts of their location and architecture. Years afterward he threw before our delighted eyes the vast panorama of the Central American temples, made to stand again through his genius in all their magnificence above tropical forests. This work is but an amplification of the patient care with which he reconstructed the steps in the manufacture of an humble arrowhead. Holmes' work in American archeology is vital; it tells the story; it is an invitation to culture historians to pursue a method that uncovers underlying facts; it is free to all, and fortunate is the student who takes his method seriously. The methods of Holmes have given dignity and standing to American archeology that have been recognized throughout the world, and it is apparent that his influence has raised the standard of the science wherever its activities are known.

UNITED STATES NATIONAL MUSEUM
WASHINGTON, D.C.

Anthropology of the Chippewa

By ALEŠ HRDLIČKA



ON June 30, 1915, the total Indian population of the United States was given by the Indian Office as 333,000,¹ of which nearly 174,000 are reported as of full-blood; the fact is, however, that actual full-bloods are much less numerous today than given officially, aggregating, in the writer's opinion, fewer than 100,000. The assimilation of the Indians into the white population has progressed much farther than is generally appreciated, and is proceeding at a steadily increasing rate. Poverty of the Indian women in some cases and their riches in others, with their attractive looks and other good qualities, and the many wifeless white men on the frontiers, favor the process of miscegenation. Regular intermarriage, moreover, is everywhere sanctioned, and no physiological repugnance, such as is manifest on the part of whites toward negroes, exists between the white and the Indian. As a result, wherever there is contact of the two races, mixture with whites is manifest and increasing. Large and important tribes are already so mixed that it is a task for the anthropologist to find a sufficient number of full-bloods for his studies, and those found are usually the old, who will pass away before many years. In the Eastern, Northern, Central, and Southern states few tribes indeed offer other conditions; and the Northwest, West, and Southwest are progressing in the same direction.

Under these circumstances the need grows more urgent to determine the physical type of at least the most important tribes before the full-bloods have wholly disappeared, and among the foremost of such tribes are the Chippewa, or Ojibway. It is the largest Algonquian tribe, numbering at present well over 25,000 individuals; it has been closely connected with the history of American colonization for approximately three centuries, during which it remained generally friendly to the whites and especially to the French; and it is a tribe which led protracted and sanguinary wars with most of its neighbors, especially with the Sioux, as a result of which it acquired even within historic times an extensive domain in the northern territories. No other body of the Algonquian Indians has attained

¹ Report of the Commissioner of Indian Affairs, Washington, 1915, p. 66.



CHIPPEWA DWELLINGS AT CROSS LAKE ABOUT THE MIDDLE OF APRIL

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such power or importance; yet until recently we knew practically nothing of the exact physical characteristics of this people.¹

The Chippewa traditions, remarkably well preserved, place the ancient abode of the tribe, a few centuries before the coming of the whites, somewhere along the northern part of the Atlantic coast, below the St Lawrence. There seem to exist some vague notions of a still earlier migration eastward from the west or northwest, but in this respect tradition is dim. From the coast the Chippewa extended or migrated to the St Lawrence, and along that river reached in course of time, and after much fighting with the Iroquois, the Great Lakes, especially the vicinity of upper Lake Michigan and Sault Ste Marie, where early in the seventeenth century they were found by the French. From these points, by continued conquest, facilitated by being provided early with firearms through the French, they progressed southward and especially westward until they occupied large portions of the present states of Michigan and Wisconsin, most of Minnesota, and parts of North Dakota as far as the Turtle mountains, at the same time extending along Lake Superior into Canada.²

At present the main body of the tribe, numbering about 12,000 persons, live in northern Minnesota on the White Earth, Leech Lake, Red Lake, and several smaller reservations. The country they occupy is mostly a wilderness of brush, and of birch, poplar, and pine forests, with many lakes and swamps. Some of the lakes are very large, and a few, such as Sandy lake, are exceedingly beautiful. The country is cold and for the greater part not well suited to agriculture. Fortunately the lakes and, in spring, also their outlets, teem with fish, and there is still some game, which, together with the product of a little farming, some maple sugar, wild fruits, wild-rice, and the wages earned by working for the whites, provide the Chippewa with the necessaries of life. But the writer has seen much poverty, especially among the old and feeble, and largely as a result there is much disease, particularly teeth decay, trachoma, scrofula, and consumption. The dress, housing, and habits of life of the Chippewa are now largely those

¹ The only anthropological studies made among the Chippewa were those by some students under Professor Boas' direction on the occasion of the World's Exposition at Chicago, but the measurements were restricted in number, the only ones reported upon (F. Boas, *Zur Anthropologie der nordamerikanischen Indianer*, *Verhandl. Berlin Anthr. Ges.*, 1895, p. 367 et seq.) being the stature, length and breadth of head, and length and height of face. The series of "full-bloods" examined included, however, it is now evident, many who were not wholly of that status. (Since this was written, a contribution to the subject of Chippewa full-bloods and mixed-bloods has been published by Prof. A. E. Jenks under the title "Indian-White Amalgamation", *Bull. Univ. Minnesota*, no. 6, 1916, pp. 1-24.)

² See W. W. Warren, *History of the Ojibways*, *Collections of the Minnesota Historical Society*, vol. v, St Paul, 1885; Margry, *Découvertes*, and the *Jesuit Relations*; also text as well as bibliographies in *Handbook of American Indians*, *Bull.* 30, B. A. E., art. "Chippewa".

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of the neighboring whites, and on the whole the tribe is well advanced toward civilization.

Owing to their contact with whites for three centuries (the first Frenchmen seem to have reached the Chippewa about 1612), the tribe is very much mixed. Most of this mixture is of French origin, but that of more recent times includes different elements of whites now settled or employed in the country.

In behalf of the numerous mixed-bloods on the White Earth reservation, some of whom are well educated and self-supporting, the United States Congress in 1906-1907 enacted laws which made possible individual allotments of the tribal lands and permitted alienation of property by mixed-bloods. Some of the allotments were covered with valuable timber, while others were desirable on account of the rich soil, the proximity to lakes, or for other reasons. The majority of the Indians were poor, without knowledge of the value of their property or of the ways of white men, and with little or no protection. They became a rapid and easy prey of lumber companies and a multitude of land sharks, as a result of which, within a few years, hundreds of individuals, including full-bloods and minors, were pauperized, and the White Earth affair has become one of the most shameful pages in the history of the white man's dealings with the Indian.

These facts are mentioned, however, only because they led indirectly to an anthropological study of the tribe. The frauds practised against the White Earth Chippewa became known to the Government, and a serious and prolonged effort was made by the Department of Justice to correct the evil. During the course of the last few years, more than fifteen hundred suits were filed against companies and individuals concerned in the frauds, and many of these could have been settled in justice to the Indian had it not been for the uncertainty respecting the blood status of many of those involved. Efforts were made by the Government authorities, as well as by the opposing interests, to obtain a satisfactory genealogy of each Indian concerned, only to reach the conviction that such data could not be relied on to establish beyond legal doubt the full-bloodedness of any individual.

It was at this point that anthropology was appealed to, and the writer was intrusted with the examination of the White Earth Chippewa who claimed to be or were regarded as full-bloods, with the view of passing on their blood status. There were about 800 such persons, 696 of whom were actually examined and their status determined.

Fortunately the writer in his extended work among Indians, the first requisite of which was the separation of full-bloods from the

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mixed, had acquired considerable experience in this direction. To fortify himself still further, however, he spent a month among the Sioux and on some of the most isolated Chippewa reservations, and several new tests and observations were made on both unquestionable full-bloods and on mixed-bloods of known status. The additional experience thus gained proved invaluable in the final work, as it was not only possible to detect and separate all mixed-bloods from full-bloods, but to form a fair estimate of the proportion of white blood wherever mixture existed.

As was expected, a large proportion of the tribe was found to be mixed with whites in all possible grades, while relatively few are mixed with Indians of other tribes, and only a few with negroes.¹ Nevertheless, a number also were discovered of those who, so far as physical examination could show, were still genuine full-bloods, but unfortunately these were mostly middle-aged or old people. How their families escaped mixture is difficult to explain, but the main cause was probably isolation in distant or inaccessible parts of the territory. Notwithstanding their age, however, many of these individuals were still in good physical condition, so that observations and measurements of value were practicable.² The best preserved of the subjects, without further selection, will be reported on in the following pages. The decrepit, and those in whose cases the interests of justice have not yet been satisfied, it was necessary to exclude. The total remaining number of subjects available for report comprised 17 males and 42 females. This striking preponderance of the females is not due to the necessary eliminations but largely to the numerical preponderance of that sex among the aged Chippewa generally.

In age the males to be reported on range from 19 to 83 years, the females from 16 to 87; but only 4 of the males and 6 of the females were below 46, while more than half of each sex exceeded 60.³ Only

¹ These last cases are very unfortunate, and the friends of the Indian, as well as the authorities over him, should do their best to prevent their increase, for they degrade the race and remove from the progeny the possibility of amalgamation with the whites, in which lies their future.

² At Cross Lake a woman 85 years of age was found chopping down a tree nearly three feet in diameter, wielding a four-pound ax (pl. XIII). This was about nine o'clock in the morning. At about one o'clock, on our return, we found the woman still at work, assisted by her daughter, herself an elderly woman. The tree was by this time more than half cut. The cutting was not done in white-man's fashion, but all around, in much the manner employed by a beaver.

³ Age distribution of subjects:

Years	Subjects (<i>m.</i>)	Per cent	Subjects (<i>f.</i>)	Per cent
16	—	—	1	2
19-23	2	12	—	—
24-45	2	12	5	12
46-60	4	23	13	31
61-70	6	35	11	26
71-80	3	17	9	21
Above 80	—	—	3	7

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one male and one female were subadult, but both were so well developed that they can be included in the groups.

DESCRIPTIVE OBSERVATIONS

Physiognomy.—The physiognomy of the Chippewa was found to be thoroughly Indian, presenting nothing distinctive from that of other North American tribes whose head-form is not widely different. It could best be described as typical ordinary Indian, without specially marked features.

Color of Skin.—The color of the skin was examined in each subject on the face and the chest.

The *face color* of the full-blood Chippewa differs somewhat, as usual, in the two sexes, being slightly darker in the males; but there are no marked differences with age so long as the skin remains normal. The shade was recorded in 65 per cent of the males and 43 per cent of the females as medium brown; in one subject of each sex as somewhat darker than medium; and in 29 per cent of the males and 54 per cent of the females as submedium brown. As a rule it was slightly lighter on the upper habitually shaded part of the forehead than on the lower parts of the face; while in those who have suffered much exposure to the elements it showed on the most forward parts of the face a dusky red "sunburn" or intensification.

The value of the *chest color* proved to be much greater than was anticipated, particularly in the diagnosis of mixed-bloods. It calls for exposure up to near the lower end of the sternum in the middle and to the upper portion of the breasts on the sides. In full-bloods the color of these parts was found to be uniform without exception, and generally a shade or more lighter than that of the face. It was recorded as submedium brown in 77 per cent of the males and 35 per cent of the females, and as dusky-yellow or dusky-yellowish in 23 per cent of the males and 65 per cent of the females. Even when of lighter shade, as in some of the females, it lacked completely all suggestion of whitish or pinkish, and it lacked all spotting or mottling.

Skin Reaction.—An interesting test developed by the writer during the preliminary work and one that proved of much diagnostic value, both as to blood status and as to the general health of the person, consisted of drawing with some force the nail of the fore-finger over the chest, along the middle and also a few inches to each side. This creates a reaction consisting of reddening, or hyperæmia, along the lines drawn. In the full-bloods the reaction as a rule is quite slight to moderate, and evanescent, or of only moderate duration; in mixed-



CHIPPEWA WAR-CHIEF AND WIFE

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bloods, unless anæmic, it is more intense as well as lasting. Exceptional behavior in this respect is rare in both classes of subjects. The exact shade of color, and sex or age, do not seem to matter, so long as the skin is healthy.

Color of Eyes.—The eyes of the full-blood Chippewa are generally dark-brown, in some instances in young subjects very dark; occasionally a shade less than dark, but not so light as medium brown. The pigmentation is such that no radiation in the iris is observable. With the exception of the disappearance of the very dark-brown shades in later life, and possibly a slight lightening of the browns in general, no decided change with age could be recorded; and no marked difference was seen in the eye color between the two sexes, though there is perhaps a little more tendency in the females toward the darker shades. The conjunctiva, bluish in the young and pearly white during advanced childhood and adolescence, later becomes more or less yellowish as among other Indians.

Eye Slant.—In the young and most of the middle-aged Chippewa the eye-slits show slight to fairly marked slant, with the outer canthi, especially that of the right side, higher than the inner. In no instance was the slant excessive. On the whole it was slightly more marked in the females, which stands in connection with the lesser development of the supraorbital ridges in this sex. Among those above 60 years of age, the eye-slits were almost invariably more or less affected and narrowed by disease.

Color of Hair.—The hair of the Chippewa full-bloods is moderately lustrous black, as among other Indians. In about 20 per cent of the adults in favorable light it reflected a trace of brownish. This was especially noticeable directly above the forehead, and may have been due to exposure to sun, or possibly to the action of alkaline soap.¹

Grayness.—The majority of the individuals here reported on showed more or less gray hair. The oldest male who had no gray hair was 50 years of age, the oldest female 53, while the youngest male in whom some gray hair existed was 46 and the youngest female 42 years. On the whole it may be said that in the full-blood Chippewa gray hair begins to manifest itself after 40 years, somewhat later than in whites; that it is invariably present to a greater or lesser extent at 60 years; that it predominates over the black between 61 and 70 years; and that with rare exceptions grayness is marked to complete in those above 70. Where grayness was advanced, part of the hair

¹ A number of full-blood Sioux children were seen whose hair color has suffered by the free application of cheap soap.

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was generally more or less yellowish-gray; and in no instance had the grayness reached the grade of whiteness that is not uncommonly found in old men and especially in old women of our own race.

Loss of Hair.—With the exception of one male 76 years of age, in whom there was a slight loss of hair over the forehead, and one female of 74 years in whom there was a slight thinning of the hair over the top, no loss among the full-bloods was observed. In this respect there is very marked difference between the full-bloods and the mixed-bloods, in which latter, in old age, more or less calvitia is common.

Character of Hair.—Up to old age the hair of the full-blood Chippewa was found to be invariably straight, although in two instances where it was worn long by men, the ends showed a tendency to turn up. Among the very old, whose hair is mostly unkempt, it occasionally looks less straight, but this appearance disappeared when the hair was properly combed. In the women of the tribe the hair directly above the forehead is often more or less wavy, owing to occasional artificial curling. As to coarseness, it was observed that the hair was never fine nor very coarse; it could be described as medium.

Mustache and Beard.—The mustache and beard in full-blood male Chippewa is scanty to very scanty. It is rather less in quantity as well as in growth than among some other Indian tribes; but neither mustache nor beard was ever completely absent. No beard grows on the sides of the face.

Among the full-blood women there was in no instance even a very slight mustache or beard, the most that was observed being fine down. This point is also of importance, for in mixed-blood women of advanced years slight mustache is not uncommon.

The Forehead.—The forehead in full-blood Chippewa, as already mentioned, is frequently low in appearance, especially in the females, and occasionally it also slopes very perceptibly. The height was recorded as medium or nearly medium in 42 per cent of the males, and but 17 per cent of the females; and as below medium to low in 58 per cent of the males, and 83 per cent of the females. It was additionally more or less sloping in nearly half of the men (47 per cent), and in one-seventh of the women. The greater frequency of this latter feature in the males stands in direct connection with marked development of the supraorbital ridges in that sex.

Supraorbital Ridges.—The development of the supraorbital ridges in full-blood Chippewa is in general stronger in both sexes than among whites. The exact conditions will be seen from the following records:



FULL-BLOOD CHIPPEWA, WHITE EARTH RESERVATION

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DEVELOPMENT OF SUPRAORBITAL RIDGES

	MALES		FEMALES	
	Subjects	Per cent	Subjects	Per cent
Hardly any.....	.	..	1	2
Submedium.....	.	..	2	5
About as in average whites.....	1	6	22	52
Above medium.....	8	47	14	33
Pronounced.....	8	47	3	7

In the most marked cases the ridges approached a complete arch; but generally they were restricted to the median half to two-thirds of the supraorbital space.

Malars.—The malars were found invariably larger or more prominent than in average whites, and in many instances the excess over the same features in the whites was very marked. The detailed records show the following conditions:

PROMINENCE OF MALAR BONES¹

	MALES		FEMALES	
	Subjects	Per cent	Subjects	Per cent
Moderate, as average in white Americans, in.....	.	..	..	..
Fairly prominent or large.....	5	29	14	33
Prominent or large.....	9	53	22	52

As here used, "large" and "prominent" are almost equivalent characters, the chief difference being that the first term is more applicable to those in whom the face is full. In the same persons when emaciated or aged, the malars would appear prominent.

Nose: Root.—The root of the nose in Indians at large is on the average appreciably stouter than in the whites; and the same condition prevails among the full-blood Chippewa. This characteristic is of some importance and tends to disappear in the mixed-bloods.

Bridge.—The nasal bridge among the Chippewa was never found to be very high. As to its outline, this was markedly aquiline in only a little more than one-fourth of the males and in none of the females. In the females, as will be seen from the following detailed records, it was most frequently straight, more or less concave, or concavo-convex.

BRIDGE OF THE NOSE

	MALES		FEMALES	
	Subjects	Per cent	Subjects	Per cent
Straight or nearly so, in.....	2	12	11	26
Convex.....	{slightly	.	5	12
	{moderately	4	1	2
	{markedly	5

¹ Above medium of average whites, males, 3, or 17 per cent.

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		MALES		FEMALES	
		Subjects	Per cent	Subjects	Per cent
Concave	{slightly	2	12	7	17
	{moderately	1	6	1	2
	{markedly	.	..	6	14
Concavo-convex	{slightly	.	..	3	7
	{moderately	3	17	3	7
	{markedly	.	..	5	12

Septum.—The nasal septum, observations on the inclination of which are of some anthropological value, was found to differ considerably in this respect among the Chippewa. It was as follows:

NASAL SEPTUM					
		MALES		FEMALES	
		Subjects	Per cent	Subjects	Per cent
Horizontal or nearly so, in		5	29	22	52
Inclined upward	{slightly	1	6	4	10
	{moderately	1	6	3	7
	{markedly	.	..	.	..
Inclined downward	{slightly	3	17	6	14
	{moderately	4	23	3	7
	{markedly	3	17	4	10

The higher grades of downward inclination of the septum predominate among the old, owing to the growth of the free parts of the nose up to relatively old age. Horizontal septa, and to a slight extent also those inclined upward, were found more frequently in the females, while the downward inclinations were in general more common in the males. These conditions again are connected with the length of the nasal bridge, which, relatively to the facial length, averages somewhat greater in the males than in the females.

Lips.—In three-fifths of the male and three-fourths of the female full-blood Chippewa, the lips are in dimensions, as well as in shape, about as in average whites, but in the remaining proportion of cases one (generally the lower) or both lips were found slightly to moderately stouter. In two of the old males in whom the lower lip seemed thicker, it was merely everted. Thin upper lips were seen in several cases among the old, but were in every case connected with and no doubt due to loss of teeth and to alveolar absorption.

Prognathism.—Facial prognathism, such as found among the negro, is practically unknown among Indians; but alveolar prognathism of moderate degree is common. In about one-fourth of the subjects here reported on, loss of teeth and more or less absorption of the alveolar process made a correct estimate of this feature impossible. Among the rest of the subjects the notations were as follows:



FULL-BLOOD CHIPPEWA, WHITE EARTH RESERVATION

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ALVEOLAR PROGNATHISM

	MALES		FEMALES	
	Subjects	Per cent	Subjects	Per cent
About as average in whites, in . . . . .	..	..	6	16
Slightly to moderately above the average in whites	12	92	28	74
Marked	1	8	4	10

The more marked cases of alveolar prognathism were mostly accompanied, as generally is the case, by slightly to moderately thicker lips.

Chin.—The Indian chin, while never receding, is as a rule slightly less prominent than the average chin in whites; and in men it is occasionally square. These conditions were found true of the Chippewa. The chin was relatively strong, but only moderately prominent in all the males as well as in all the females; and it was square in two, or 12 per cent, of the males.

Lower Jaw.—On the whole, the lower jaw in the Indian is stronger than in civilized whites, including Americans, and no exception to this was found to exist among the Chippewa examined.

The angles of the jaw are never so subdued in full-blood Indians as they frequently are in whites, and particularly in the women. Among the Chippewa, in two-thirds of the males and in more than nine-tenths of the females they were about normal, neither weak nor excessive; in the remaining third of the males and in one female they were more or less protruding.

Shape of Upper Incisors.—The upper incisors of the Indian, as repeatedly pointed out by the writer, differ in shape in a characteristic way from those of the whites, by presenting a marked cingulum about their lingual surface, which gives this surface a decided "shovel-shaped" concavity. Such incisors were found in every case of the full-blood Chippewa where the upper incisors could still be examined; in more than half of the males and four-fifths of the females, however, these teeth were either considerably worn or lost, so that their character could not be determined.

The Body.—The general status of the neck, chest, and rest of the body among the full-blood Chippewa was found to correspond closely to that of other Indians. These parts are never slender, even in childhood, but frequently are quite stocky. The chest in particular is large, especially in the males. In most cases married women grow stout, though not obese. The development of the breasts in the women is never too small nor again excessive. The limbs in both sexes are strong, though not abnormally so; the hands and feet are of moderate dimensions. The nails of both fingers and toes are larger than the average in whites.

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Remarks.—In reviewing the above descriptions it will be seen that the full-blood Chippewa, as mentioned before, are quite typical, ordinary Indians, without any special attributes. The expression of their face is usually kindly, their behavior cheerful and friendly, not forward. In youth, and sometimes even in age, both men and women show fine bearing, and their features are not without a native beauty, which in the case of women favored the high degree of miscegenation suffered by the tribe. The old erroneous impressions of casual observers that the Indians, and especially the Indian women, age early, was found to be groundless.

MEASUREMENTS¹

The majority of the Chippewa are rather tall and well-proportioned people; but there seem to have existed differences in stature between the different bands. The tallest full-bloods were found about Red lake, while the shortest appear to have been those about Nett, Pelican, and Vermilion lakes.

The height of the 59 subjects dealt with in this report is given below. As the series includes many aged persons, the general averages might have been expected to be slightly below what they should be; but this was found not to be the case, doubtless owing to the generally good physical condition of those included. Thus, the mean height of the 10 youngest and the 10 oldest women is identical (157.23 and 157.22 cm., respectively), and the same may be said of the general average for the sex. Similar conditions exist in the male series. It is interesting to note in this connection that the average stature of the Chippewa measured on the occasion of the World's Columbian Exposition at Chicago and reported by Boas,² although the series must include many mixed-bloods, is practically the same as that obtained by the writer, namely, 171.7 for the males and 157.4 for the females.³

Cm.	STATURE		MALES		FEMALES	
			Subjects	Per cent	Subjects	Per cent
148.2-150.		3	7
150.1-155.		8	20
155.1-160.		20	49

¹ All measurements, unless otherwise indicated, are those of the International Agreement.

² F. Boas, op. cit., p. 366 et seq.

³ Most of the mixture in the tribe, as mentioned before, is French, who on the whole were probably of about the same stature as the Chippewa. The opinion of Boas, expressed in the paper above quoted, that mixed-bloods among the Indians tend to be of greater stature than the full-bloods, is, the writer has some reason to believe, applicable only to those cases where the whites responsible for the mixture were of greater average stature than the tribe into which the foreign blood was introduced.



FULL-BLOOD CHIPPEWA MAN, RED LAKE

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Cm.	MALES		FEMALES	
	Subjects	Per cent	Subjects	Per cent
160.1-165.....	1	6	10	24
165.1-170.....	7	41
170.1-175.....	4	23	..	..
175.1-180.....	5	29	..	..
Average.....	171.9 cm.		157.2 cm.	
Minimum.....	164.4 cm.		148.7 cm.	
Maximum.....	180.0 cm.		164.7 cm.	

The difference between the male and female average stature (14.7 cm.) is unusually high in this tribe, the percental relation of the female height to that of the male being only as 91.45 to 100. The usual difference in height between the sexes ranges about 12 centimeters, the percentage of female to the male average being close to 93. Among the 59 tribes reported by Boas, there were but 6 (Cree, Crow, Pawnee, Micmac, and two of the Pueblo groups) in which this proportion was equal to that among the Chippewa or only slightly lower, while among the 21 Southwestern and Mexican tribes reported on by the writer,¹ there were but three such tribes (Tepehuane, Yaqui, and Papago). The cause of this unusual difference between the height of the two sexes is probably some generalized special advantage relating to the development of the males, or a special general disadvantage affecting the females of these tribes; in other words, we are more likely dealing with a physiological than with an hereditary and permanent condition. It must also be borne in mind in this connection, that if all our groups were ideally constituted as to both number and age, the exceptional position of some of the tribes in the matter of height might be reduced or disappear.

Of the better-known tribes of northern United States, those that stand erect nearest in stature to the Chippewa are, according to the data reported by Boas, the Micmac and Abenaki (171.7 cm.), Delaware (171.5), Iroquois (172.7), Pawnee (171.3), Sioux (172.6), Blackfeet (171.5), and Arapaho (172.8). These tribes are either Algonquian or, the Sioux excepted, their close physical relations.

Head Measurements

The head of the full-blood Chippewa as a rule was found free from cradle-board or other deformation, and also from pathological conditions that would affect its shape. Only one full-blood showed

¹ A. Hrdlička, *The Stature of the Indians of the Southwest and of Northern Mexico*, *Putnam Anniversary Volume*, Cedar Rapids, Iowa, 1909, pp. 405-424.

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moderate flattening of the occiput, the origin of which was not determined; while one mixed-blood presented fairly marked scaphocephaly.

The size of the head as a whole is exceptionally good, exceeding that of many other tribes and comparing favorably with that of whites of similar stature; it is probable, however, that the scalp and subcutaneous tissues are slightly more developed in the Chippewa than in whites, and that the skull is somewhat thicker, so that the interior of the skull and the brain are slightly smaller than in whites, as is general among Indians. Nevertheless, the case is worthy of attention. The high average measurements are not due to a number of individual large heads, and the characteristic is shared by both sexes. Nor is the large size of the head connected with a superior mentality of the tribe, for the people, while able and intelligent, can hardly be said to be more so than the Sioux or other Indians living under similar conditions.

The main data relating to the three principal dimensions of the skull are as follows:

LENGTH OF HEAD		
<i>Cm.</i>	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
18.2-18.5.....	..	22
18.6-19.0.....	6	39
19.1-19.5.....	23	29
19.6-20.0.....	47	7
20.1-21.0.....	17	2
Above 21.0.....	6	..
Average.....	19.9 cm.	19.0 cm.
Minimum.....	18.8 cm.	18.2 cm.
Maximum.....	21.2 cm.	20.2 cm.
Old-American whites.....	19.7 cm.	18.7 cm.

BREADTH OF HEAD		
<i>Cm.</i>	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
14.4-14.5.....	..	4
14.6-15.0.....	..	29
15.1-15.5.....	19	47
15.6-16.0.....	63	20
16.1-16.5.....	19	..
Average.....	15.8 cm.	15.2 cm.
Minimum.....	15.4 cm.	14.4 cm.
Maximum.....	16.5 cm.	15.9 cm.
Old-American whites.....	15.4 cm.	14.8 cm.



THE OLD CHIEF OF BEAULIEU

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HEIGHT OF HEAD		
Biauricular line (floor of meatus) to Bregma		
Cm.	MALES Per cent	FEMALES Per cent
12.7-13.0.....	6	15
13.0-13.5.....	25	63
13.6-14.0.....	50	22
14.1-14.5.....	13	..
14.6-14.9.....	6	..
Average.....	13.78 cm.	13.36 cm.
Minimum.....	12.9 cm.	12.7 cm.
Maximum.....	14.9 cm.	13.9 cm.
Old-American whites.....	13.8 cm.	13.3 cm.

Cephalic Module, or Mean Diameter

The size of the head, though apparent from the three main individual measurements of the vault, is best expressed by the mean diameter or cephalic module $\frac{(L. + B. + H.)}{3}$. The module of the Chippewa averages in the two sexes, respectively, 16.49 and 15.84 centimeters, which is about what is obtained in tall whites, and exceeds the cephalic module in any other Indian tribe hitherto measured by the author.

CEPHALIC MODULE		
Cm.	MALES Per cent	FEMALES Per cent
15.01-15.50.....	..	12
15.51-16.00.....	6	64
16.01-16.50.....	47	21
16.51-17.00.....	41	2
17.01-17.53.....	6	..
Average.....	16.49 cm.	15.84 cm.
Minimum.....	15.73 cm.	15.33 cm.
Maximum.....	17.53 cm.	16.53 cm.
Old-American whites.....	16.30 cm.	15.60 cm.

An even more precise method of showing size of head in a given group is by determining the per-mille relation between the mean diameter of the skull and the stature. Among white Americans this relation is approximately as 94 to 1,000 in the males, and 97 in the females; in other words, there are respectively .94 and .97 millimeters of mean head diameter to each centimeter of body height. Among the Chippewa similar proportions are 96 in males and 101 in females, showing that the external dimensions of the head in the tribe are actually slightly larger than in the whites of this country. Nevertheless, the brain of the Chippewa, as already mentioned, averages probably smaller than that of these whites, owing not only to a possible excess of the soft parts surrounding the skull in the Indian, but also

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to his perceptibly thicker cranium. However, these results are of importance to anthropology, and possibly also to educators, showing that there is none or but little inherent defect in quantity of the brain tissue in these Indians.

RELATION OF CEPHALIC MODULE (= MEAN DIAMETER OF HEAD) TO STATURE

	$\left\{ \frac{\text{Cephalic Module} \times 1000}{\text{Stature}} \right\}$	
	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
90.0- 92.5.....	6	..
92.6- 95.0.....	35	..
95.1- 97.5.....	29	13
97.6-100.0.....	29	24
100.1-102.5.....	..	26
102.6-105.0.....	..	29
105.1-107.8.....	..	7
Average.....	95.9	100.8
Minimum.....	91.8	95.2
Maximum.....	100.0	107.8
Old-American whites.....	93.9	96.6

Form of the Head

Cephalic Index.—The two series of Chippewa reported in 1896 by Boas¹ gave for the more easterly contingents of the tribe, in males, the cephalic index of 82.2, and for the more westerly 80.2. These results alone are sufficient proof that the series in question included many mixed-bloods, who, being mostly of French-Indian origin, possess relatively shorter and broader heads. The series examined by the writer gives the averages of 79.6 for the males and 80.1 for the females, which would correspond to about 77.6 and 78.1, respectively, in skulls, proportions which are probably much nearer the true type of the head in this tribe than those above. By the usual classification and considering the skull rather than the head, about nine-tenths of the full-blood-like Chippewa are dolichocephalic to mesocephalic, and approximately one-tenth mildly brachycephalic.

	CEPHALIC INDEX	
	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
73.7-75.0.....	6	..
75.1-77.5.....	13	5
77.6-80.0.....	25	51
80.1-82.5.....	50	32
82.6-84.2.....	6	12
Average.....	79.6	80.1
Minimum.....	73.7	77.4
Maximum.....	83.0	83.1

¹ Op. cit., p. 388.



a



b



c



d

FULL-BLOOD CHIPPEWA

a, Woman near Elbow Lake. *b*, A family on the road (the man a full-blood; the wife and child mixed). *c*, Woman near Mahnommen, one of the best types. *d*, Sister of Chief Daydodge, the oldest full-blood in the tribe.

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Even thus, however, the tribe does not occupy the place expected among the Algonquians. As shown in the writer's recent publication on Eastern crania,¹ the Algonquians were generally dolichocephalic, especially in the Northeastern states, somewhere in which, according to Chippewa tradition, was their old home. If this tradition is reliable, then the Chippewa have modified within the last few centuries, through admixture or from other causes, in the direction of greater broadheadedness.

RELATION OF THE CHIPPEWA TO OTHER NORTHERN TRIBES, IN CEPHALIC INDEX

	LIVING	CORRESPONDING SKULLS (Estimated)
Arapaho.....	78.6	76.6
Iroquois ²	79.3	77.3
Ute.....	79.5	77.5
<i>Chippewa</i> (full-bloods).....	79.6	77.6
Mandan and Gros Ventres.....	79.6	77.6
Micmac and Abenaki ²	79.8	77.8
Delaware ²	79.8	77.8
Cree ²	79.8	77.8
Blackfeet.....	79.8	77.8
Sioux.....	79.8	77.8
Pawnee ²	80.0	78.0

Intertribal mixture would explain the same phenomenon, but so far as known the Chippewa mixed only with the Ottawa, Potawatomi, some Fox Indians, and some Sioux, none of which tribes are brachycephalic.

The Height Indexes.—The relative value of the height of the head in any given group can be expressed by the old-fashioned height-length and height-breadth indexes, or by an index which to the writer seems more logical and satisfactory, obtained by comparing the height not with either length or breadth of the skull, dimensions which are closely compensatory to each other, but with the mean of the two. This relation for brevity may be called simply "the mean height index" of the head.³

To avoid misunderstanding, it should be stated that the height taken by the author throughout his work among the Indians as well as among other races, is that from the base-line of the auditory canals

¹ A. Hrdlička, *Physical Anthropology of the Lenape or Delawares, and of the Eastern Indians in General*, Bull. 62, B. A. E., Washington, 1916, pp. 11-130; also *Contributions from the Museum of the American Indian, Heye Foundation*, vol. III, 1916.

² Series doubtless includes a considerable number of mixed-bloods.

³ For data on related index in the skull, see *Physical Anthropology of the Lenape, etc.*, op. cit., pp. 116-117.

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to bregma. This is readily taken by calipers slightly modified for that purpose.¹

The height thus secured averages in white American males 13.8 centimeters, and in females 13.25 centimeters; while among Indians, so far as known, its averages range in different tribes between 13.2 and 13.9 centimeters in the males, and between 12.8 and 13.4 centimeters in the females. Among the Chippewa they are respectively 13.78 and 13.36 centimeters, and hence are not far from the maximum of the American tribes. But, as will be seen later, this is due to the size of the head in the tribe; relatively to the other two mean dimensions of the head the height is quite moderate.

The following three tables give the principal data on the height indexes among the Chippewa, while in the fourth are given comparative data on the Chippewa, the Indian tribes of the Southwest and Mexico, and the American whites.² The most interesting results seen are that in the height-length and especially in the more important mean height index, the Chippewa agree fairly closely with the whites, but stand in both respects perceptibly below the Southwestern Indians. On the whole, however, all three indexes relating to height are slightly to moderately smaller in the Chippewa than in either of the two other groups, showing that the Chippewa head has increased more particularly in the directions of its length and breadth, or in other words that, while absolutely quite high, relatively to the other measurements of the vault its height is only moderate. It is unfortunate that we have as yet no adequate series of similar determinations on other Northern and Northeastern tribes. Among the Sioux recently studied by the writer, the absolute height of the head is frequently quite low, and the height indexes are all lower even than in the Chippewa.

HEIGHT-LENGTH INDEX

	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
65.1-67.5.....	13	7
67.6-70.0.....	57	34
70.1-72.5.....	31	37
72.6-74.3.....	..	22
Average.....	69.4	70.4
Minimum.....	67.0	65.7
Maximum.....	72.2	74.3

¹ Compas d'épaisseur Hrdlička (Collin, Paris). The modification consists of a slightly different bend of the branches, so that when extended to about the usual biauricular breadth, the end portions for some distance from each point are horizontal; and in the provision near each point of a tooth or guard which assures the equidistant introduction of the points into the meatus in each case, and at the same time prevents their introduction so far that they might do damage.

² The whites referred to are at least three generations American on each parental side.



CHIPPEWA FULL-BLOODS

(Upper figure, near Round Lake; lower figures, at Pine Point)

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HEIGHT-BREADTH INDEX

	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
82.6-85.0.....	19	21
85.1-87.5.....	44	31
87.6-90.0.....	19	19
90.1-92.5.....	19	24
92.6.....	..	5
Average.....	87.2	87.9
Minimum.....	82.7	83.3
Maximum.....	91.8	93.2

MEAN HEIGHT INDEX OF THE HEAD

	$\left\{ H: \frac{L. + B.}{2} \right\}$	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
70.1-72.5.....		6	..
72.6-75.0.....		56	59
75.1-77.5.....		38	32
77.6-80.0.....		..	10
Average.....		77.2	78.1
Minimum.....		70.3	72.2
Maximum.....		77.1	78.7

AVERAGE HEAD DIMENSIONS AND HEIGHT INDEXES IN THE CHIPPEWA, IN INDIANS OF THE SOUTHWEST AND MEXICO, AND WHITE AMERICANS

THE CHIPPEWA

	MALES <i>Cm.</i>		FEMALES <i>Cm.</i>
Height of Head.....	13.78		13.36
Breadth of Head.....	15.8	} Mean = 17.85	15.2
Length of Head.....	19.9		19.0
Height-Length Index.....	69.4		70.4
Height-Breadth Index....	87.2		87.9
Mean Height Index of the Head.....	77.2		78.1

THE INDIANS (TWENTY-FOUR TRIBES) OF THE SOUTHWEST AND NORTHERN MEXICO

	MALES <i>Cm.</i>		FEMALES <i>Cm.</i>
Height of Head.....	13.46		13.06
Breadth of Head.....	15.00	} Mean = 16.815	14.51
Length of Head.....	18.63		17.83
Height-Length Index.....	72.3		73.3
Height-Breadth Index.....	89.7		90.0
Mean Height Index of the Head.....	80.0		80.8

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WHITE AMERICANS

	MALES Cm.		FEMALES Cm.
Height of Head.....	13.8		13.25
Breadth of Head.....	15.4	} Mean = 17.55	14.8
Length of Head.....	19.7		18.65
Height-Length Index.....	70.0		71.0
Height-Breadth Index.....	89.5		89.5
Mean Height Index of the Head.....	78.6		79.2

In concluding this subject, attention should be called to the remarkable uniformity or low extent of variation of the mean height index of the head. In practically 60 per cent of both males and females the index ranges over less than three points, or from 72.6 to 75; and the total difference between the minimum and maximum in each sex is less than seven points. If this is compared with either the height-length or height-breadth index, it will be appreciated how much more satisfactorily the relative value of the height of the head is expressed by the new index, which promises in general to be of considerable value to anthropology.

Dimensions of the Face

The face of the Chippewa is in general of good proportions, without being so impressively large as among the Sioux. Unfortunately in the majority of the older subjects of both sexes the teeth were found so worn down, or so many of them were lost, that accurate measurements of the two heights of the face were impracticable. Taking only the individuals most nearly normal as to teeth and jaws, the dimensions obtained were as given in the table on page 217.

Comparing the above averages with those obtained by the writer among Southwestern tribes who stand nearest in stature to the Chippewa, we see, as will be apparent from the following figures, that the Chippewa face, so far as height is concerned, is almost precisely like that of the Pima, whose body height is also almost identical. In this respect therefore the Chippewa face may be regarded as typically Indian, and does not follow the exceptional length and other dimensions of the vault.

FACIAL HEIGHT IN TRIBES OF SIMILAR STATURE

	Stature Cm.	Chin-nasion Height Cm.	Chin-hairline Height Cm.
Havasupai.....	170.6	12.1	18.8
Papago.....	170.9	12.3	18.8
Mohave.....	171.0	11.8	18.5
Pima.....	171.8	12.3	19.0
Chippewa.....	171.9	12.4	19.0



FULL-BLOOD CHIPPEWA WOMAN OF LEECH LAKE

HRDLIČKA—CHIPPEWA ANTHROPOLOGY

FACE
(In subjects least affected by loss of teeth and alveolar absorption)

INDIVIDUALS	MALES					FEMALES				
	Height, Chin-nasion	Height, Chin-crinion	Corresponding Breadth	Anatomical Index	Physiognomic Index	Height, Chin-nasion	Height, Chin-crinion	Corresponding Breadth	Anatomical Index	Physiognomic Index
	Cm.	Cm.	Cm.			Cm.	Cm.	Cm.		
	13.0	20.0	15.3	84.97	76.5	11.8	18.2	13.8	85.51	75.8
	12.7	18.7	15.6	81.41	83.4	11.8	18.6	13.5	87.41	72.6
	12.6	18.3	14.9	84.56	81.4	12.0	18.6	14.1	85.11	75.8
	12.3	19.8	14.8	83.11	74.8	11.8	18.4	14.0	84.29	76.1
	12.0	18.4	14.5	82.76	78.8	12.0	17.8	13.8	86.96	77.5
	12.4	18.3	14.4	86.11	78.7	12.2	19.0	13.9	87.77	73.2
	12.4	19.2	15.0	82.67	78.1	12.5	18.5	14.6	85.03	78.9
	12.2	18.6	14.5	84.14	78.0	11.9	17.2	14.2	83.80	82.6
						11.7	18.0	14.2	82.39	78.9
						11.9	17.2	14.2	83.80	82.6
Average.....	12.45	18.91	14.88	83.7	78.7	11.96	18.15	14.03	85.2	77.3
Average of all cases.....	12.41	19.0	15.15			11.35	17.7	14.24		
Minimum.....	12.0	18.3				11.7	17.2			
Maximum.....	13.0	20.0				12.5	19.0			

HOLMES ANNIVERSARY VOLUME

In the United States whites,¹ the two heights of the face average respectively in the males 12 and 18.4 centimeters, in the females 11.1 and 17.5 centimeters, showing smaller dimensions than presented by the Chippewa, particularly in the females.

Breadth of Face.—The breadth of the face (diam. bizygomatic max.) is but little affected by age after the thirtieth year, so that use can be made in the present case of the observations on the entire series of individuals studied. The results obtained are given in condensed form below.

BREADTH OF FACE (Diam. bizygom. max.)		
<i>Cm.</i>	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
13.5 .....	..	2
13.51-14.0 .....	..	38
14.01-14.5	18	34
14.55-15.0	29	24
15.01-15.5	29	2
15.51-16.0	24	..
Average	15.15 cm.	14.24 cm.
Minimum	14.4 cm.	13.5 cm.
Maximum	16.0 cm.	15.2 cm.

The breadth of the Chippewa face is seen to be rather high in both sexes. As shown below, it exceeds that of any of the South-western tribes which stand nearest in stature, and it is considerably in excess of the facial breadth that prevailed among the Eastern Algonquians.²

FACIAL BREADTH IN TRIBES OF SIMILAR STATURE

	MALES <i>Cm.</i>	FEMALES <i>Cm.</i>
Havasupai	14.7	..
Papago	14.2	13.3
Mohave	14.8	14.0
Pima	14.4	13.7
<i>Chippewa</i>	15.15	14.24

Excessive bizygomatic breadth, such as here observed, goes hand in hand with strong development of the temporal muscles, which in turn characterizes more especially the hunting tribes; and the Chippewa were in the main hunters and fishermen.

In Old-American whites the average breadth of the face is only 13.9 centimeters in the males and 13 centimeters in the females, and

¹ Americans of three or more generations.

² See the writer's *Physical Anthropology of the Lenape, etc.*, 1916, p. 123.



FULL-BLOOD CHIPPEWA WOMEN OF MILLE LACS

HRDLIČKA—CHIPPEWA ANTHROPOLOGY

this with but slightly smaller breadth of the vault (white male Americans, 15.4; Chippewa, 15.8 cm.). Among other nationalities of whites the breadth of face differs somewhat from group to group, but it is always decidedly below that of the Chippewa. It is due to this fact, as has already been shown by Boas¹ (although his "full-bloods" were by no means wholly such), that the mixed-bloods in the tribe present narrower faces as a rule.

Facial Indexes.—The facial indexes in the Chippewa are difficult to determine precisely, owing to the fact that in so many of the individuals examined the teeth are worn or decayed, while the small groups of the best subjects in this respect cannot properly represent the whole. Possibly the nearest approach to true conditions will be gained by taking the facial height as a whole and making allowance for defective teeth. This allowance, not made entirely arbitrarily, will amount to 4 millimeters in the males and 5 millimeters in the females, in which latter sex the teeth were on the whole in poorer condition. By this means we obtain, for the whole series of subjects, the following average facial proportions and indexes:

	Chin-nasion Height (cm.)		Chin-hairline Height (cm.)		Dm. Bizygom. max. (cm.)		Morph'gic Index		Physiogn'ic Index	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
<i>Chippewa</i>	12.81	11.85	19.4	18.2	15.15	14.24	84.5	83.2	78.1	78.2
Indians of Southwest....	11.81	11.14	18.46	17.23	14.35	13.55	82.2	82.1	77.7	78.7
Old-American whites....	12.0	11.1	18.4	17.5	13.9	13.00	86.3	85.2	75.4	74.3

From the above the Chippewa face is seen to be absolutely high; absolutely broad; near that of other Indians in relative proportions, especially taking the face as a whole; but relatively, besides absolutely, broader than that of the whites.

Height of Forehead.—The forehead of the Chippewa, especially in the women, frequently appears quite low, as mentioned under "Observations". It seemed decidedly lower than among the whites, and even lower on the whole than among some other Indian tribes. To these impressions the actual measurements would seem to offer a refutation. As will be seen from the next table and comparisons, the actual height from nasion to hairline is much the same in the Chippewa and the Southwestern tribes, and when compared with Old-American whites there is but slight difference in favor of the latter in the female sex. Yet the visual observations were not erroneous. The Chippewa fore-

¹ Op. cit., p. 411.

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head appears lower than that of the whites, owing to the decidedly greater development in these Indians, in both sexes, of the supraorbital region, and the appearance is frequently heightened by the lesser or greater slope of the forehead, which in a measure is due to the same cause. Among the American whites the supraorbital region is generally but moderately developed in the males and hardly at all developed in females, merging in many cases completely and without perceptible line of demarkation with the forehead. Besides, the forehead in whites is in many instances almost vertical—characteristics all of which favor the impression of greater height. Should we enlarge the frontal sinuses and the whole supraorbital region so that a marked depression or line of demarkation would appear between it and the forehead proper, we should get in the same subjects and without any change in the actual height from nasion to hairline, the impression of a much lower forehead; and this is the case among the Chippewa.

Another factor which enhances to some degree the apparent superiority of the forehead in the whites is their more subdued dimensions of the rest of the face. This again is particularly true of women and becomes more clearly apparent when we compare the height of the forehead with the total height of the face. The detailed figures bearing on these questions are as follow.

HEIGHT OF FOREHEAD		
<i>Cm.</i>	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
5.30-5.5.....	..	10
5.51-6.0.....	31	26
6.01-6.5.....	23	31
6.51-7.0.....	31	24
7.01-7.5.....	15	10
Average..... 6.6 = 34.7% of total	6.3 = 35.9% of total	
	facial height	facial height
Minimum..... 5.7	5.3	
Maximum..... 7.4	7.5	
Indians of the		
Southwest..... 6.65 = 35.0% approx.	6.1 = 35.3% approx.	
Old-American		
whites..... 6.4 = 34.8%	6.4 = 36.6%	

Still another condition should be mentioned which, in white subjects, and particularly in males above 30 years of age, frequently causes the appearance of high forehead, and which is very rare among healthy full-blood Indians. This is loss of hair over the forehead. Such loss, in greater or lesser degree, is common among highly civilized white male adults of all classes, frequently precedes the loss of hair over the top, and gives the forehead a fine high aspect.



FULL-BLOOD CHIPPEWA WOMEN
(Left, Mille Lacs; right, Twin Lakes)

HRDLIČKA—CHIPPEWA ANTHROPOLOGY

Considering only normal conditions, it is impossible not to reflect on the close similarity in height and, as will be seen later, also in breadth of the forehead, in the "savage" Indian and in a group of whites representing the oldest American families, who intellectually stand surely on a par, if not above, with any larger similarly constituted group of white men. There is certainly here no external evidence of any marked effect on the forehead of a more highly developed brain. But it must always be remembered that the vault of the Indian skull averages thicker than that of the highly civilized white man; so that with the same size of head, and the same height of forehead as in the Indian, the white man's brain will nevertheless be larger as a whole, and higher as well as broader in the frontal region.

Breadth of Forehead.—The breadth of the forehead, as expressed by the diameter frontal minimum, is perceptibly larger among the Chippewa, especially in the men, than it is among the Southwestern and Mexican Indians; and it is even very slightly larger in the Chippewa than in the Old-American whites. There is no question, however, as already indicated, that the intracranial breadth in the same region is superior in whites to that of the Indians, owing to the greater thickness of bone in the latter.

Correlation of the diameter frontal minimum with cephalic index, among the Indians, is small, and the same is the case, if not more so, with the correlation between frontal breadth and the breadth of the face (diam. bizygom. max.).

BREADTH OF FOREHEAD

Cm.	(Diam. frontal min.)	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
9.30-9.5.....		..	2
9.51-10.0.....		..	29
10.01-10.5.....		29	38
10.51-11.0.....		59	31
11.01-11.4.....		12	..
Average.....		10.76 cm.	10.26 cm.
Minimum.....		10.3 cm.	9.3 cm.
Maximum.....		11.4 cm.	10.8 cm.
Indians of the Southwest.....		10.47 cm.	10.17 cm.
Old-American whites.....		10.6 cm.	10.2 cm.

Breadth of Lower Jaw.—Within a given group of people the breadth of the lower jaw at its angles is an individual characteristic of only secondary importance, but between racial groups the differences between the average proportions of this diameter may be of considerable interest.

On the whole it may be said that the bigonial diameter increases

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with the breadth of the face, but the correlation shows numerous exceptions. The diameter also differs in the two sexes, being absolutely smaller in the female, but relatively to the facial breadth the dimension may be even slightly greater in the females than in males. This happens among the Chippewa, but such a condition is not general among Indians. Among the whites the jaw is perceptibly narrower in relation to facial breadth in the females than in the males.

BREADTH OF THE LOWER JAW

<i>Cm.</i>	(Diam. bigonial max.)	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
10.30-10.5.....		..	21
10.51-11.0.....		41	48
11.01-11.5.....		6	31
11.51-12.0.....		35	..
12.01-12.5.....		12	..
12.51-12.6.....		6	..
Average.....		11.51 cm.	10.88 cm.
Minimum.....		10.60 cm.	10.30 cm.
Maximum.....		12.60 cm.	11.40 cm.
Indians of the Southwest.....		10.79 cm.	10.15 cm.
Old-American whites.....		10.70 cm.	9.90 cm.
Per cent of facial breadth			
<i>Chippewa</i>		76.0	76.4
Indians of the Southwest.....		75.2	74.9
Old-American whites.....		77.0	76.2

An interesting and anthropologically significant relation is that between the breadth of the lower jaw and the smallest breadth of the forehead. As will be seen from the next table, the index of this relation is decidedly lower among the Chippewa than among the Indians of the Southwest, indicating a relatively broader jaw in the former; and excepting the Chippewa females it is lower in both groups than it is in whites, showing the jaw to be not only absolutely but also relatively somewhat narrow in the latter group. In all three series the index is higher in the females than in the males, demonstrating that not only absolutely but also in relation to the forehead the female jaw is the narrower.

RELATION OF BREADTH OF FOREHEAD TO BREADTH OF LOWER JAW

	$\left\{ \frac{\text{Diam. frontal minim.} \times 100}{\text{Diam. bigonial}} \right\}$	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
80.1-85.....		..	2
85.1-90.....		29	14
90.1-95.....		35	45



CHIPPEWA FULL-BLOOD (RIGHT) AND MIXED-BLOOD (LEFT).
WHITE EARTH

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	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
95.1-100.....	24	29
101.0-105.....	12	10
Average.....	93.8	94.4
Minimum.....	87.2	84.6
Maximum.....	102.8	103.8
Indians of the Southwest.....	97.0	100.2
Old-American whites.....	99.1	103.0

The Nose.—In conformity with the large face the Chippewa have also on the average a rather large nose, although, as already mentioned under "Observations", it is never very prominent.

The *nasal index*, which is usually of considerable importance, does not rise quite so high in Chippewa males as in the Indians of the Southwest. In females the mean nasal index of Southwestern tribes is slightly surpassed by the Chippewa, but this is only because the latter series includes many aged individuals in whom the nasal breadth is in general relatively greater than it is in younger adults. Taking only the subjects up to 60 years of age, the mean index in the females is found to be 76.6. The tribe, as in the case of the majority of Indians, is mesorhinic.

NOSE			
	LENGTH	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
<i>Cm.</i>			
4.60-5.0.....		12	21
5.01-5.5.....		29	69
5.51-6.0.....		35	10
6.01-6.5.....		24	..
Average.....		5.66 cm.	5.23 cm.
Minimum.....		4.70 cm.	4.60 cm.
Maximum.....		6.50 cm.	5.90 cm.
Indians of the Southwest.....		5.18 cm.	4.80 cm.
Old-American whites.....		5.37 cm.	4.94 cm.
BREADTH			
		MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
<i>Cm.</i>			
3.20-3.5.....		..	5
3.51-4.0.....		12	38
4.05-4.5.....		65	50
4.51-5.0.....		24	7
Average.....		4.28 cm.	4.14 cm.
Minimum.....		3.80 cm.	3.20 cm.
Maximum.....		4.70 cm.	4.90 cm.
Indians of the Southwest.....		4.15 cm.	3.78 cm.
Old-American whites.....		3.60 cm.	3.30 cm.

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NASAL INDEX	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
60.1-65.....	6	..
65.1-70.....	24	2
70.1-75.....	6	29
75.01-80.....	41	29
80.1-85.....	6	24
85.1-90.....	18	12
Above 90.....	..	5
Average.....	75.5	79.0
	In subjects up to 60, 76.6	
Minimum.....	63.1	65.3
Maximum.....	89.4	100.0
Indians of the Southwest.....	80.4	78.6
Old-American whites.....	67.1	66.6

Breadth of Mouth.—The breadth of the mouth, taken between the most distal points at which the mucous membrane in the corners of the mouth joins the skin, is broader in the Chippewa than in the Indians of the Southwest in general, and considerably broader in both than in Old-American whites. In this respect again some slight allowance must be made, because our series includes so many old persons in whom, before the alveolar processes suffer absorption, the mouth averages larger than in young adults.

The comparative figures below show an additional fact of interest—the difference between the breadth of the mouth in the two sexes is greater among whites than among the Indians; in other words, the mouth in white females is relatively smaller, compared with that of the males, than in any of the Indians.

MOUTH: BREADTH	MALES <i>Per cent</i>	FEMALES <i>Per cent</i>
<i>Cm.</i>		
5.20-5.5.....	..	17
5.60-6.0.....	31	37
6.10-6.5.....	38	34
6.51-7.0.....	31	11
Average.....	6.27 cm.	6.04 cm.
Minimum.....	5.6 cm.	5.2 cm.
Maximum.....	7.0 cm.	6.9 cm.
Indians of the Southwest.....	5.9 cm.	5.5 cm.
Old-American whites.....	5.3 cm.	4.7 cm.

The Left Ear.—The external ear, as well known, is a structure of anthropological interest. The selection of the left ear for purposes of measurement is due merely to the greater ease of manipulating the instrument on the left side.

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The Indian auricle, considered alone or in relation to stature or length of face, is generally large, perceptibly larger than the ear of the white man, and even more so than the ear of the negro. It could be conveniently designated as *macropinnic*, while that of the majority of white men is *mesopinnic*, and that of most of the African negroes *micropinnic*. The Chippewa agree in this respect with the rest of the Indians. The slightly higher value of the length of their ear than that in other tribes is attributable to the number of old persons in the series; the external ear grows to some extent in length with age.

The index of the ear (percental relation between breadth and length) is somewhat lower in the Chippewa and in other Indians than in the American whites, showing that in the latter the ear is not only absolutely but also relatively shorter.

LEFT EAR: LENGTH

Cm.	MALES Per cent	FEMALES Per cent
5.6-6.0.....	..	5
6.1-6.5.....	15	20
6.6-7.0.....	31	49
7.1-7.5.....	31	22
7.6-8.0.....	8	5
Above 8.....	15	..
Average	7.2 cm.	6.85 cm.
Minimum.....	6.4 cm.	5.8 cm.
Maximum.....	8.9 cm.	8.0 cm.
Other Indians.....	7.25 cm.	6.95 cm.
Old-American whites.....	6.7 cm.	6.1 cm.

LEFT EAR: BREADTH

Cm.	MALES Per cent	FEMALES Per cent
3.30-3.5.....	8	18
3.51-3.75.....	15	33
3.76-4.0.....	62	33
4.01-4.25.....	8	15
4.26-4.5.....	8	..
Average.....	3.88 cm.	3.77 cm.
Minimum.....	3.5 cm.	3.3 cm.
Maximum.....	4.3 cm.	4.2 cm.
Other Indians.....	3.9 cm.	3.7 cm.
Old-American whites.....	3.75 cm.	3.45 cm.

LEFT EAR: INDEX

	MALES Per cent	FEMALES Per cent
47.2-50.0.....	8	17
50.1-55.0.....	62	32
55.1-60.0.....	23	29
60.1-65.2.....	8	22

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	MALES	FEMALES
Average.....	53.8	55.4
Minimum.....	47.2	48.1
Maximum.....	60.9	65.2
Other Indians.....	53.2	53.6
Old-American whites.....	56.3	56.5

Body Measurements.—No body measurements were taken among the Chippewa, the work being carried on in an inclement season; but the loss is not great; as the series included so many old persons.

CONCLUSIONS

The observations on and measurements of the Chippewa show the following main points:

In color, physiognomy, hair, and visible characteristics in general, the full-blood Chippewa of today are completely of the ordinary Indian type, showing no special features.

In stature they range from medium to tall, in body development from medium to stocky, the latter predominating.

The head is large, predominantly mesocephalic, and of medium height. The face is both long and broad, the supraorbital ridges frequently pronounced, the forehead often more or less sloping, especially among the men, and often low in appearance, particularly among the women.

The nose is of good size, with medium prominence, and differs considerably in shape; in men it is in half the cases more or less aquiline, in women mostly straight, concave, or concavo-convex. The septum is frequently horizontal or nearly so, especially in the females. The average nasal index is mesorhinic, as among the majority of Indians.

Alveolar prognathism in the average is slightly to moderately more marked than in whites; the lips in the majority of cases are of medium dimensions, comparable with those of whites, but occasionally the lower lip or both lips are slightly stouter; the chin and lower jaw are well though not excessively developed; the mouth is rather broad. The ears are large, as among Indians in general.

The tribe, though Algonquian in language and supposedly of eastern origin, shows a larger and relatively broader head, as well as a broader face, than most of the Eastern Indians. In these respects it is probably nearer some of the more central and northern Algonquian tribes, and as will be shown in a future study, it also approaches



CHIPPEWA WOMAN, EIGHTY-FIVE YEARS OF AGE,
CHOPPING DOWN A LARGE TREE AT
CROSS LAKE



CHIPPEWA WOMAN OF CROSS LAKE MAKING "CAS-
EROLES" PREPARATORY TO MOVING TO A
SUGAR CAMP

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the Sioux fairly close in some respects, though in the latter the stature is still somewhat higher, the face larger, and the vault of the head lower.

In conclusion, it may be mentioned that individual variation among the apparently full-blood Chippewa of today was found in all respects to be quite moderate, which indicates that during the history of the tribe there has been no extensive admixture with Indians of different physical types.

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Ethnic Amalgamation

By ALBERT ERNEST JENKS



TO DAY it is common observational knowledge that the so-called "hybrid races" of man are not infertile, as Broca and others believed. There are no true human hybrid groups similar in sterility to the hybrid mule. There are those who believe that amalgamation, or hybridization, is the chief source of increased fertility in groups of people. What are the facts in the case? We may make some attempt at this time at a scientific answer to the following questions:

What effect, if any, has amalgamation on the fertility or fecundity of the various human groups amalgamating? If amalgamation has any consistent effect on fecundity, at what stage in the process may it be seen? Does it show least or most in those families beginning the process of amalgamation, or in those families most completely amalgamated, or in those somewhere in the intermediate stages of amalgamation?

The data used in this study consist of certain results of ethnic censuses of 40,000 families in Minneapolis, Minnesota; 480 families in Sioux Falls, South Dakota; and 95 families in Lake Benton township, Lincoln county, Minnesota. In 1909 I began to gather data for an ethnic map of Minneapolis, then a city of 300,000 population. Advanced students recorded on blanks the ethnic composition of the 40,000 families studied. We learned whether both husband and wife are so-called pure-bred members of the same ethnic group, as, for instance, Irish, or whether one is, for instance, Norwegian and the other German, or whether the amalgamation process has gone so far that the person does not know his ethnic composition, and as a result calls himself an "American". The blanks also show whether husband and wife are foreign-born, or are native American-born, and, if the latter, what generation of American birth the person is. The number of unmarried children in the family was also shown. Three years were given to the survey. In the summer of 1915 Mr Stanley P. Jones, an advanced student, gathered facts in Sioux Falls, South Dakota, a city of about 20,000 population. During the school year of 1914-15 Miss Ethel Hanke, a former student who had assisted in the Minneapolis census, gathered data in Lake Benton, a township of about 800 population in southwestern Minnesota. In both Sioux Falls and

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Lake Benton we secured data for the purpose of studying amalgamation, cohesion, and the effect of amalgamation on fecundity. So, in addition to the facts obtained in Minneapolis, we ascertained for both heads of all families the age at marriage, the number of years married, and the number of all living children.

When the term "pure-bred" or "pure blood" is used in this study, as, for instance, "pure-bred Norwegian", the meaning is that the persons are to the best of their knowledge and belief descendants solely of a single ethnic group of ancestors. All these ethnic groups, as Norwegian, Irish, Welsh, German, etc., are historically known to be more or less mixed, yet they are sufficiently "pure-bred" that the marriages within such an ethnic group are easily distinguishable from mixed marriages between two such ethnic groups.

The accompanying Table A, entitled "Relative Fecundity of Pure-bred and Half-breed Families in Minneapolis," presents, in its left half, data on fourteen ethnic groups of so-called pure-bred families. Under the first column, entitled "Ethnic Group", are ranged, in order of decreasing fecundity, fourteen out of thirty-seven so-called pure-bred ethnic groups, families of which we found in Minneapolis. Group number 6, the "German", comprises also the Austrian families, since it was discovered that Jews, Magyars, and the families of various Slavic groups from Austria-Hungary commonly designated themselves as other than Austrians: persons who commonly spoke of themselves as "Austrians" were in practically every case Austrian-Germans. Group number 7, the "Canadian", comprises all Canadian families, except French-Canadian. We found in Minneapolis that the so-called "French-Canadian" families were very pure French, and that the other Canadian families were well amalgamated. They comprised Scotch, English, Welsh, and Irish blood, in the main. Group 13, the "American", comprises all families whose ancestry is so mixed as to be practically unknown in its ethnic components. There are relatively few exceptions to the rule that in Minneapolis most parents who are of the third generation of American birth are so the product of amalgamation that they do not completely know their ethnic composition.

By following the first group, the Dutch, across the table, from left to right, it may be noted that we studied thirty families in Minneapolis both heads of which were Dutch—as we commonly say, "Holland-Dutch". Those families had 106 unmarried children, being an average of 3.53 children per family. Pure-bred Dutch men or women had married pure-bred mates from thirteen ethnic groups other than Dutch. There were 181 such half-breed families with a total of 331

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TABLE A
RELATIVE FECUNDITY OF PURE-BRED AND HALF-BRED FAMILIES IN MINNEAPOLIS

ETHNIC GROUP	PURE-BRED FAMILIES				HALF-BRED FAMILIES			
	No. of Families	No. of Children	Ave. No. Children per Family	No. of Amalgamating Groups ¹	No. of Families	No. of Children	Ave. No. Children	Expected Average
1. Dutch.....	30	106	3.53	13	181	331	1.83	2.4
2. French-Canadian.....	282	894	3.15	16	291	627	2.15	2.7
3. Irish.....	1022	2670	2.61	23	2100	4282	2.04	2.4
4. Swedish.....	4961	12564	2.53	15	2004	3625	1.81	2.4
5. Norwegian.....	3028	7414	2.44	22	2148	3868	1.80	2.4
6. German.....	3505	8559	2.44	33	3520	6235	1.77	2.1
7. Canadian.....	372	838	2.25	13	861	1670	1.94	2.3
8. Scotch.....	184	411	2.23	18	897	1602	1.78	2.1
9. French.....	155	334	2.14	21	665	1251	1.88	2.2
10. Danish.....	246	509	2.06	9	265	471	1.77	2.1
11. English.....	523	1014	1.93	20	1882	3252	1.72	2.0
12. Welsh.....	77	127	1.64	17	233	399	1.71	1.8
13. American.....	8614	13156	1.52	28	3859	6392	1.66	1.9
14. Scotch-Irish.....	16	24	1.50	15	229	395	1.73	1.8

¹ This column of figures contains the total number of amalgamating groups, including the smaller groups of a few families each. If we emphasize those groups in which the amalgamation process is well established, having ten or more families in each, the number of such groups is, in the order of the groups in the table, as follows: 6, 7, 14, 13, 11, 19, 10, 11, 9, 5, 13, 6, 16, 7.

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unmarried children, making an average of 1.83 children per Dutch half-breed family—as against 3.53 children for the Dutch pure-bred family. Not only is the Dutch half-breed family much less fecund than the Dutch pure-bred family, but the average for the Dutch half-breed families is also noticeably lower than the expected average for said families. This expected average is computed from the fourteen ethnic groups composing the 181 Dutch half-breed families. The expected average is 2.4 children per family, while the actual average is only 1.83 children—the fact of amalgamation apparently being the cause for reduced fecundity. The decreasing of fecundity in the various half-breed groups is the outstanding fact of the table.

We may note that Group 13, the “American”, composed of the most completely amalgamated families, has only 1.52 unmarried children per family. This is the lowest fecundity of all the so-called pure-bred groups, except the Scotch-Irish, in which, however, there are only sixteen families, and in which the fecundity is only .02 per cent less than the American. The three groups at the bottom of the table, namely, Welsh, American, and Scotch-Irish, have the lowest fecundity of the so-called pure-bred families. Each of the three groups has its fecundity slightly increased by intermarriage with other pure-bred families. This would be expected in case of the American, because such half-breed families are nearer pure-bred than are the amalgamated American families. Also it might be expected that the groups which, pure-bred, have a relatively low fecundity, would, on interbreeding with others which are mostly of higher fecundity, have an increased fecundity in their half-breed families. However, even in the case of these least fecund groups, amalgamation is seen to lower fecundity because each of the three half-breed groups is less fecund than the expected average and the average of the averages.

Table B, entitled “Relative Fecundity of Pure-bred and Half-breed Families in Sioux Falls, South Dakota,” presents data on all living children. The table presents, in the left half, eight different so-called pure-bred groups, with a total of 246 families. The groups are arranged in order of decreasing fecundity for pure-bred families. In the right half are 359 half-breed families, one head of each of which is of the given ethnic group while the other is of some other pure-bred group.

The same story of decreasing fecundity in the half-breed families is told by the data in Table B, from the families in a small city, as by those in Table A, from a city of 300,000 population. The fecundity is less in every half-breed group, except the American. This in-

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creased fecundity of the American half-breed group is additional proof that amalgamation decreases fecundity, because the so-called American half-breed group is in reality more pure-bred than the so-called pure-bred American group, since the "American" family is the highly amalgamated family.

Supporting evidence that amalgamation decreases fecundity is presented by the fourth column of figures in each half of Table B. In these columns are shown the average number of married years of the mothers (to the age of 42) per child born. In the Swedish, German, Irish, and Norwegian groups more married years are required per child in the half-breed families than in the pure-bred families. The Scotch, English, Canadian, and American groups are exceptions. But the fewness of the Scotch and Canadian families may explain their cases. The American is really not an exception, for the reason noted in the preceding paragraph. The English group offers a clear-cut and outstanding exception, however.

TABLE B
RELATIVE FECUNDITY OF PURE-BRED AND HALF-BREED FAMILIES IN SIOUX FALLS, SOUTH DAKOTA

ETHNIC GROUP	PURE-BRED FAMILIES				HALF-BREED FAMILIES			
	No. of Families	No. of Children	Ave. No. Children per Family	Ave. No. Married Years per Child	No. of Families	No. of Children	Ave. No. Children per Family	Ave. No. Married Years per Child
1. Swedish	13	45	3.46	3.66	23	37	1.61	3.92
2. Scotch	3	10	3.33	5.20	20	43	2.15	4.96
3. German	51	133	2.61	4.60	71	85	1.20	6.88
4. English	16	41	2.56	6.17	45	98	2.18	5.01
5. Irish	15	36	2.40	4.55	53	120	2.26	4.78
6. Norwegian	40	81	2.02	4.29	42	56	1.33	5.64
7. Canadian	3	6	2.00	9.66	15	29	1.93	5.26
8. American	105	191	1.81	6.37	90	174	1.93	5.77

Lake Benton township, Lincoln county, southwestern Minnesota, is a hilly country with only about 800 inhabitants. We have fecundity data from 54 families in six pure-bred ethnic groups, and from 29 families in half-breed ethnic groups in this country district.

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Exactly the same story of fecundity decreased by amalgamation is told by the data in Table C as is told by the preceding tables. Each half-breed group is less fecund than its nearest related pure-bred group.

The fourth column in each half of the table, presenting the average number of married years of the mothers (to the age of 42) per child born, shows more conclusively than Table B that more married years are required per child in the half-breed families than in the pure-bred families.

TABLE C
RELATIVE FECUNDITY OF PURE-BRED AND HALF-BREED FAMILIES IN LAKE
BENTON TOWNSHIP, LINCOLN COUNTY, MINNESOTA

ETHNIC GROUP	PURE-BRED FAMILIES				HALF-BREED FAMILIES				
	No. of Families	No. of Children	Ave. No. Children per Family	Ave. No. Married Years per Child	No. of Groups	No. of Families	No. of Children	Ave. No. Children per Family	Ave. No. Married Years per Child
1. Swedish.....	5	28	5.60	3.11	4	6	11	1.83	6.45
2. German.....	18	92	5.11	3.33	7	12	24	2.00	5.31
3. Danish.....	8	29	3.62	3.52	4	6	15	2.50	4.84
4. Norwegian...	8	25	3.12	4.88	3	5	8	1.60	6.00
5. American....	12	31	2.58	6.22	6	8	22	2.75	5.32
6. Irish.....	3	8	2.66	5.62	3	6	5	0.83	16.40

Lake Benton furnishes us 12 families farther along in the amalgamation process than the half-breed family. They are families whose two heads are themselves half-breeds, or quarter-breeds, etc. Those families average 1.91 children. This is one child for each 6.91 married years. This is a longer period of time than is required by any of the pure-bred groups, and longer even than is required by any of the half-breed groups in Table C, except the Irish.

Table D, entitled "Ethnic Amalgamation versus Ethnic Cohesion in Minneapolis," brings the results of a study of the antagonistic forces of cohesion and amalgamation in eight large ethnic groups in Minneapolis.

Ethnic cohesion is a complex of conditions resulting in the tendency of men and women of the same ethnic group to marry. Ethnic

TABLE D
ETHNIC AMALGAMATION VERSUS ETHNIC COHESION IN MINNEAPOLIS

SCOTCH

BIRTHPLACE AND GENERATION	MEN				WOMEN				BOTH			
	Marry in Group		Marry out of Group		Marry in Group		Marry out of Group		Marry in Group		Marry out of Group	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
	No. of Men				No. of Women				No. of Both			
Foreign-born.....	100	44	129	56	160	97	61	39	389	197	51	49
1st Amer. gener. . . .	48	18	212	82	178	51	29	71	438	99	23	77
2d Amer. gener. . . .	18	13	124	87	121	20	17	83	263	38	14	86
3d Amer. gener. . . .	18	20	72	80	93	16	17	83	183	34	19	81
Total.....	184	26	537	74	552	184	33	67	1273	368	29	71
Families.....	...	..	...	..	...	...	..	..	...	184	..	..

WELSH

BIRTHPLACE AND GENERATION	MEN				WOMEN				BOTH			
	Marry in Group		Marry out of Group		Marry in Group		Marry out of Group		Marry in Group		Marry out of Group	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
	No. of Men				No. of Women				No. of Both			
Foreign-born.....	67	42	63	25	49	32	65	35	116	74	64	36
1st Amer. gener. . . .	91	28	31	63	88	37	42	58	179	65	36	64
2d Amer. gener. . . .	37	5	14	32	39	6	15	85	76	11	14	86
3d Amer. gener. . . .	30	2	7	28	15	2	13	87	45	4	9	91
Total.....	225	77	34	148	191	77	40	60	416	154	37	63
Families.....	77

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TABLE D—Continued
ENGLISH

BIRTHPLACE AND GENERATION	MEN				WOMEN				BOTH			
	Marry in Group		Marry out of Group		Marry in Group		Marry out of Group		Marry in Group		Marry out of Group	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
	No. of Men				No. of Women				No. of Both			
Foreign-born.....	197	38	317	62	193	50	194	50	390	43	511	57
1st Amer. gener....	140	24	440	76	153	30	352	70	293	27	792	73
2d Amer. gener....	75	27	204	73	75	27	208	73	150	27	412	73
3d Amer. gener....	111	43	146	57	102	47	115	53	213	45	261	55
Total.....	523	32	1107	68	523	38	869	62	1046	35	1976	65
Families.....	....	..	....	..	....	..	....	..	523	..	1976	..

IRISH

Foreign-born.....	216	55	177	45	215	58	153	42	431	57	330	43
1st Amer. gener....	753	53	669	47	734	52	677	48	1487	52	1346	48
2d Amer. gener....	49	22	173	78	69	23	237	77	118	22	410	78
3d Amer. gener....	4	5	69	95	4	6	68	94	8	6	137	94
Total.....	1022	48	1088	52	1022	47	1135	53	2044	48	2223	52
Families.....	1022	..	2223	..

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TABLE D—Continued

DANISH

BIRTHPLACE AND GENERATION	MEN				WOMEN				BOTH						
	No. of Men	Marry in Group		Marry out of Group		No. of Women	Marry in Group		Marry out of Group		No. of Both	Marry in Group		Marry out of Group	
		Number	Per cent	Number	Per cent		Number	Per cent	Number	Per cent		Number	Per cent		
Foreign-born.....	384	226	59	158	41	286	219	77	67	23	670	445	66	225	34
1st Amer. gener.....	75	17	23	58	77	62	24	39	38	61	137	41	30	96	70
2d Amer. gener.....	6	2	33	4	67	15	2	13	13	87	21	4	19	17	81
3d Amer. gener.....	1	1	100	...	...	1	1	100	...	...	2	2	100	...	...
Total.....	466	246	53	220	47	364	246	68	118	32	830	492	59	338	41
Families.....	...	...	...	...	...	...	...	...	...	...	...	246	...	338	...

GERMAN

Foreign-born.....	2157	1750	81	407	19	1954	1534	79	420	21	4111	3284	80	827	20
1st Amer. gener....	2193	1247	57	946	43	2460	1430	58	1030	42	4653	2677	58	1976	42
2d Amer. gener....	494	230	47	264	53	514	251	49	263	51	1008	481	48	527	52
3d Amer. gener....	147	52	35	95	65	180	64	36	116	64	327	116	35	211	65
Total.....	4991	3279	66	1712	34	5108	3279	64	1829	36	10099	6558	65	3541	35
Families.....	3279	...	3541	...

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TABLE D—Continued
NORWEGIAN

BIRTHPLACE AND GENERATION	MEN				WOMEN				BOTH			
	Marry in Group		Marry out of Group		No. of Women	Marry in Group		Marry out of Group		No. of Both	Marry in Group	
	Number	Per cent	Number	Per cent		Number	Per cent	Number	Per cent		Number	Per cent
Foreign-born.....	3004	84	472	16	3017	2343	78	674	22	6021	4875	81
1st Amer. gener....	787	57	335	43	1279	631	49	648	51	2066	1083	52
2d Amer. gener....	82	50	41	50	98	47	48	51	52	180	88	49
3d Amer. gener....	12	25	9	75	17	7	41	10	59	29	10	34
Total.....	3885	78	857	22	4411	3028	69	1383	31	8296	6056	73
Families.....	.....	..	...	..	.....	.....	..	.....	..	.....	3028	..
											2240	..

SWEDISH

Foreign-born.....	5043	87	654	13	4841	4340	90	501	10	9884	8729	88	1155	12
1st Amer. gener....	899	58	381	42	1064	562	53	502	47	1963	1080	55	883	45
2d Amer. gener....	84	57	36	43	89	49	55	40	45	173	97	56	76	44
3d Amer. gener....	12	50	6	50	21	10	48	11	52	33	16	48	17	52
Total.....	6038	82	1077	18	6015	4961	82	1054	18	12053	9922	82	2131	18
Families.....	4961	..	2131	..

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amalgamation is a complex of conditions resulting in the tendency of men and women of different ethnic groups to intermarry. Ethnic cohesion, as a complex, is a product of similar hereditary and cultural factors, together with consciously or unconsciously idealized physical factors. Further, these factors commonly encrust one with a strong or a weak prejudice against members of other ethnic groups. In the process of developing amalgamation it seems that the unique hereditary and historic factors, contributing to ethnic cohesion, are the most persistent, and are the last to break down; but the force of cohesion loosens its hold and the force of amalgamation takes firmer hold in direct proportion as ethnic prejudice weakens between the two ethnic groups, and as the cultural factors become mutually common.

Taken as a whole the eight ethnic groups in Table D show that there are slightly more half-breed families than pure-bred families, there being 13,616 half-breed and 13,320 pure-bred families. So the amalgamation process is the more influential. It is the most influential among the Scotch, next among the Welsh; then follow in order of decreasing influence of amalgamation the English, Irish, Danish, and German, among the last of whom amalgamation is only slightly more influential than cohesion. Among the Norwegians cohesion is more influential than amalgamation, and among the Swedes cohesion is more than twice as influential as amalgamation.

This series of ethnic groups, arranged in order of decreasing amalgamation and increasing cohesion from the Scotch to the Swedes, is the exact duplicate of the series of the same Minneapolis ethnic groups in order of increasing fecundity, except for the Irish and Scotch, as seen in Table A. It seems that the most fecund ethnic groups are those least given to amalgamation, and vice versa.

We studied 8,614 "American" families in Minneapolis. They are descendants of a great variety of generations of American ancestry—including those of the ninth. These "American" families are the most completely amalgamated of all the families studied. In the most convincing manner they tell the consistent story that fecundity decreases as amalgamation increases, as is seen in Table E.

More than 30 per cent of these American families have no unmarried children. More than half of them average only one-half of a child. It is doubtless painful to realize that the "American" stock is not fecund enough today to hold its own numerically. These 8,614 families average fewer than two unmarried children each.

There are other factors, it is true, besides amalgamation, which tend to decrease fecundity. The factor of higher education, fluctuat-

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ing somewhat generation by generation, tends to reduce the number of children per family. The usual urban conditions also tend to reduce the size of the family; not least among these factors operating in American cities is the apartment house, which almost uniformly will not allow children an entrance even at the rear door where servants and groceries are allowed. There is also the factor of the high cost of living. But amalgamation seems to be the most constant factor

TABLE E
FECUNDITY OF "AMERICAN" FAMILIES IN MINNEAPOLIS

Number of Families per Fecundity Group	Number of Unmarried Children per Family	Total Number of Children per Fecundity Group
2624	0	0
2144	1	2144
2037	2	4074
993	3	2979
465	4	1860
173	5	865
81	6	486
62	7	434
18	8	144
7	9	63
5	10	50
3	11	33
2	12	24
Total.... 8614	..	13156

Average of 1.527 unmarried children per family.

among them all. A detailed survey was made by a graduate student of 50 families with three children each, in the following seven ethnic groups in Minneapolis: American, German, Irish, Jew, Norwegian, Pole, and Swede. Data were tabulated on the vital, intellectual, social, and economic life of these families. Neither among the families of any ethnic group nor among any series of the ethnic groups were there discoverable vital, intellectual, social, or economic facts which seemed to coördinate with the fundamental fact of three children each, which was common to all families studied.

From these studies in a city of 300,000 population, of 20,000 population, and of a country district, it is evident that ethnic amalgamation, or human hybridization, is a powerful factor in America, that it does affect fecundity—being a process toward the gradual numerical weakening of the groups amalgamating. It is thus an

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increasing factor in America, affecting fecundity to the greatest extent in those families most completely amalgamated. This view is the opposite of that which holds that amalgamation is a mixing or blending together of diverse ethnic groups into a homogeneous group. This view does not accept the "melting-pot" theory.

In other words, when we consider ethnic groups in the three areas studied, the terms "pure-bred" and "prepotent" are practically synonymous. This other conclusion must be added: that as yet the "American" is not a pure-bred ethnic group, but is an extremely amalgamated group, and, in consequence of the amalgamation, is a decidedly impotent group.

Startling as this conclusion may seem to some Americans, it should not surprise us, if we think biologically. It should have been expected that, in the long run, the evolutionary factors of variation, selection, adaptation, and heredity would make the marriage of men and women of the same pure-bred ethnic group, reared under the same culture and the same environment, better fitted for reproduction than the intermarriage of men and women of different pure-bred ethnic groups reared under different cultures and different environments.

Further, it may be said, we should expect that an environment so dominant and vitalizing as is that of America will, in time, select from the myriads of children born here those whom it favors—those whom it owns—and with them breed up a "pure-bred" and "prepotent" American ethnic group. Evidently it is too early in the history of the American people to be able to know what ethnic group or groups now amalgamating here will find lasting favor in the American environment, and so be selected as the parents of the ultimate American race.

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MINNEAPOLIS

The Use of Adobe in Prehistoric Dwellings of the Southwest

By NEIL M. JUDD



THE word 'adobe', according to the Bureau of American Ethnology,¹ has been traced to an Egyptian hieroglyph denoting 'brick', thence to the Arabic *aṭ-ṭōb*, *al-ṭob*, whence the Spanish *adobar*, 'to daub', 'to plaster'. It reached the United States from Mexico, into which country it was introduced by the Spanish conquerors of the early part of the 16th century. In its present most widely accepted meaning, 'adobe' denotes a large, tabular, unbaked brick, molded in a wooden frame and dried in the sun, but it may also mean mortar made from the same material as the bricks and utilized with them in the construction of walls or in the surfacing of floors, roofs, etc. In addition, it may even mean the dry, clayey soil suitable for use in the manufacture of bricks or mortar.

Adobe, in the latter sense, occurs widely throughout the arid or semi-arid sections of southwestern United States. Being a product of aridity, it finds its greatest use, for construction purposes, in regions of little rainfall where other building materials are mostly wanting. If "necessity is the mother of invention", it seems that the primitive peoples attracted to the broad, brown plains of southern Arizona, for example, were not slow to recognize the degree of protection furnished by a layer of clayey soil spread over their first temporary shelters nor in discovering the possibilities of that soil when properly prepared for use in the erection of larger, more permanent dwellings. And yet, even though most frequently utilized in desert regions, adobe requires an abundant water supply for its successful manipulation.

The present Mexican, and even a large proportion of the American, population dwelling in southern Texas, New Mexico, and Arizona, and the adjoining sections of Chihuahua and Sonora, construct their houses of adobe bricks after a manner introduced by the Spaniards. A shallow hole near the site of the proposed structure provides a mixing place into which water is poured to soften the

¹ *Bulletin* 30, pt. 1, page 14, Fourth impression, 1912.

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earth, loosened as needed. This hole increases in size as the adobe soil is mixed, molded into bricks, and removed.

The mixing may be accomplished by the bare feet of a laborer or by means of a spoked wheel, confined within a box and turned by horse power. Straw or grass is often added to increase the tenacity of the mud which, when thoroughly prepared, is forced into sanded molds that may vary in length from 12 to 18 inches, in width from 8 to 10 inches, and in thickness from 4 to 6 inches. The resulting bricks are then removed to a flat, cleared area, spread in the sun, and completely dried preparatory to use.

Previous to the advent of the Spaniards, the Pueblo Indians made constant use of adobe in the construction of their houses, but rarely in the shape of angular bricks, and, so far as now known, these were never made in molds of fixed dimensions. Their method in 1540, as described by Castañeda in his account of the Coronado expedition, is as follows: "They gather a great pile of twigs of thyme [sagebrush] and sedge grass and set it afire, and when it is half coals and ashes they throw a quantity of dirt and water on it and mix it all together. They make round balls of this, which they use instead of stones after they are dry, fixing them with the same mixture, which comes to be like a stiff clay."¹ Under Spanish tutors, however, the Pueblos were quick to recognize the advantages of molded bricks and to the present day have continued to use them wherever practicable.

Adobe bricks, manufactured in any way approximating that above, have not yet been observed within the present confines of the United States, in ruins unquestionably identified as pre-Spanish structures. It is true that bricks of Mexican type may be found in certain cliff-houses, especially in Cañon de Chelly, but their presence is attributed to a secondary occupancy known to have occurred within historical times.² In Cliff Palace, Mesa Verde National Park, cubical adobe bricks of unquestioned antiquity, molded by hand, have been noticed by Dr Fewkes,³ but these are very rare indeed, and have not been reported from any other locality.

In North America the use of adobe as an essential feature in the construction of prehistoric dwellings seems to have been limited to the semi-arid plateau country of our Southwest. Considering solely its utility in the framework of such dwellings, it is evident that adobe was employed in walls of at least three distinct types: (1) those made

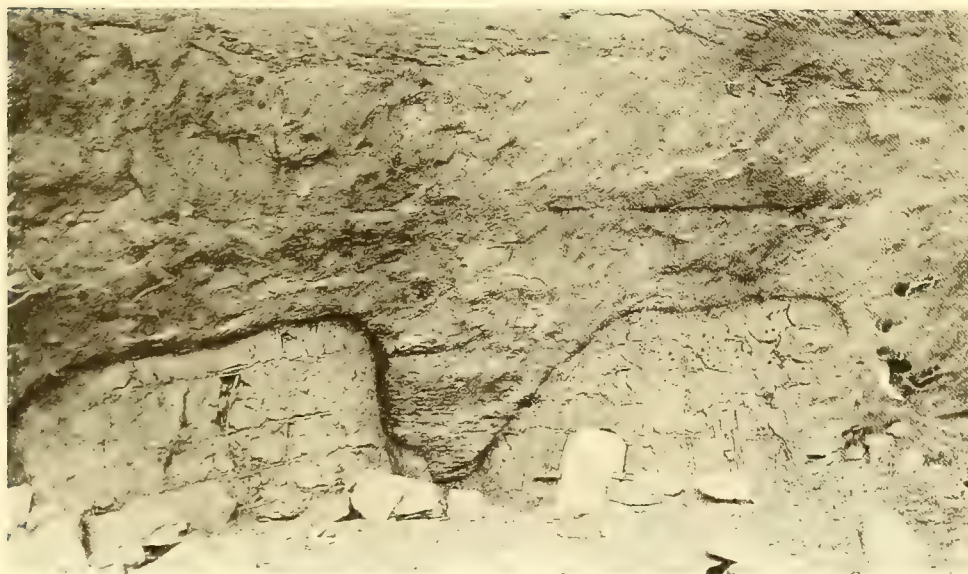
¹ *Fourteenth Report Bureau of American Ethnology*, p. 520, 1896. Mindeleff, *Eighth Rep. B. A. E.*, p. 146, 1891, notes the use of round masses of adobe in garden walls at Zuñi.

² Mindeleff in *Eighth Rep. B. A. E.*, p. 30, 1891. Mindeleff in *Amer. Anthr.*, vol. 8, no. 2, p. 164, 1895. Fewkes in *Amer. Anthr.*, n. s., vol. 12, no. 3, p. 434, 1910.

³ *Bull. 51, Bureau of American Ethnology*, p. 30, 1911.



WALL MADE OF WILLOWS PLASTERED WITH ADOBE, IN KITSIL RUIN, NAVAHO NATIONAL MONUMENT, ARIZONA



STORAGE BINS IN WHITE CAÑON, MADE OF WILLOWS PLASTERED WITH ADOBE

JUDD—USE OF ADOBE

with fragments of tabular stone, in which adobe was utilized as a mortar or binding material; (2) those made of closely fitted or interwoven willows, osiers, or reeds, thickly plastered with adobe mud; (3) those built entirely of adobe—the so-called caliche (*calèche*) or pisé construction, as observed in ancient house remains in the Gila and Salt river valleys of southern Arizona.

Walls of the first type are found in all parts of the Southwest, in ruins commonly credited to pre-Pueblo peoples. Such ruins consist both of cliff-houses and exposed dwellings, the latter built in valleys or upon elevated tablelands or mesas. Walls of this type are familiar to all students of American archeology and therefore need not be especially considered within the limited pages of the present paper. Suffice it to say that, in the erection of structures embodying such walls, the primitive artisans were governed as always by the accessibility of suitable material. Stone was near at hand and could be secured in sufficient quantities with but little labor other than that required for its transportation. Previous observations had taught the builders that, when mixed with water, desert soil possessing certain characteristics formed a satisfactory bond for irregular stone fragments, uniting them into a solid mass and adding the strength necessary to their continued stability. In house walls of this type natural deterioration could be lessened only by decreasing the amount of adobe mortar exposed to the action of the elements. The stonework in but few ancient Pueblo dwellings, however, exhibits that degree of previous preparation where it is possible to approach the complete elimination of mortar, therefore it seems reasonable to conclude that the aboriginal house-builders of our Southwest had not passed much beyond the elementary stage in their knowledge of masonry. Adobe was recognized merely as an accessible and seemingly satisfactory means of joining the stones with which their house walls were constructed, and it was so used in a vast majority of those prehistoric dwellings under consideration.

Walls of the second type, those made of willows plastered with adobe (pl. I), are found mainly in cliff-houses, although evidence of their former existence has been observed also in pueblo ruins situated in open, exposed places. Perhaps the best preserved examples of this class are to be found in conjunction with walls of the first type, in cave-dwellings of the Navaho National Monument region, north central Arizona. But here, as elsewhere, wattled walls form only a small proportion of the structure in villages of which they are a part. Houses of this character are seldom more than one story in height, and their roofs are usually, but not always, supported by the stone

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walls of adjoining buildings. Instances have been noted in which the larger roof-beams rested upon notched posts set in the corners of the room; others, in which the end walls were of stone, upholding the roof, while the sides were of clay-covered reeds or willows. In some cases such rooms have the appearance of being the result of a happy inspiration on the part of their builders—a means of completely and quickly utilizing desirable space adjoining occupied houses; in others, they seem to have played a perfectly normal part in the natural development of the village.

Walls made of adobe plastered on osiers are well known also in the cliff-houses of northeastern Arizona, especially in Cañon de Chelly, and a few have been noted in Mesa Verde National Park, southwestern Colorado. Similar structures exist likewise in Grand Gulch and neighboring cañons north of San Juan river. In the latter region are to be found many granaries, or storage bins, with walls made in the same manner as those of the dwellings. Among others, an excellent example (pl. I, II) of such a storehouse, with its original door and bolts, was photographed by the writer in 1907, while a member of a party engaged in the exploration of White cañon, Utah. It is one of two closets, almost exactly alike, and part of a small ruin near the Augusta¹ natural bridge.

During the same reconnoissance a small ruin was discovered on a ledge overlooking Armstrong cañon near the Edwin or Little² natural bridge, one room of which (pl. IV) was constructed of cedar logs, chinked and partially covered with adobe. Prehistoric habitations of this nature, however, are extremely unusual and cannot be designated rightfully as a distinct type of ancient Pueblo architecture.

Another type of wall, closely allied to that last considered and frequently met with in cliff-houses in the region south of Navaho mountain, is made from long, narrow tablets of adobe mud, each inclosing a quantity of twigs or coarse grass. For the purposes of this paper, such may be regarded properly as a form of brick. An excellent individual specimen (pl. III), from a large ruin in West cañon, is now in the National Museum and has been referred to as a "Vienna-roll" adobe.³ Finger-prints and irregularities on the surface of this and other blocks lead to the conclusion that each was shaped by the hands of a workman and placed in the wall while still in a plastic

¹ Marked as "Sipapu Bridge" on the General Land Office map of the Natural Bridges National Monument.

² "Owachomo" on the General Land Office map.

³ *American Anthropologist*, n. s., vol. 12, no. 3, July-Sept. 1910.



DOOR AND BOLTS OF A WATTLED STORAGE BIN IN WHITE CAÑON.
FINGER-MARKS IN THE ADOBE PLASTER ARE PLAINLY SEEN

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condition. As found in various ruins, such tablets or rolls are similar in shape but differ considerably in size and quantity of reënforcement.

In Arizona, walls made from bricks of this type are supposedly limited to the ancient dwellings in cañons forming the headwaters of Navaho creek, south of Navaho mountain. In southeastern Utah, where they also occur in well-preserved cliff-ruins north of San Juan river, adobe walls, reënforced with twigs or grass but not always separable into blocks like that from West cañon, were frequently employed in the erection of circular storage bins and rectangular rooms with rounded corners. The writer has also noted what appear to have been storage chambers, constructed in part at least of adobe rolls or tablets with a central core of rabbit-brush or small stems of sage, in Cottonwood cañon, 11 miles northwest of Kanab, in Kane county, Utah. It is believed that this is the only instance in which walls of this character have been reported west of the Rio Colorado.

Remains of five such structures were observed in one cave in the cañon above named. The smallest, 3 feet 6 inches in diameter, was just traceable above the loose sand covering the cave floor; the largest and best-preserved measured 11 feet in diameter and was in excellent condition. From the inside, the highest standing wall of this latter room was 5 feet 10 inches. The unmutilated portions of its upper edge were rounded and furnished no evidence that a roof of any kind had ever rested thereon.

The lower inside wall was formed by a row of thin sandstone slabs, placed on edge. On one side two additional slabs were visible where the adobe plaster had fallen away, showing that in one place at least the lower wall of this circular building consisted of three parallel stone tablets. Above these, the remaining wall appears to have been made of adobe bricks reënforced in the manner already described. On the upper edge of the wall, where some defacement had taken place, this method of construction was especially apparent. Small bunches of twigs had been inclosed in adobe, and the whole, while still soft, had been forced down upon similar masses already placed. These rolls, or bricks, seem to have been made without intentional form—most of them were rather rounded on top and correspondingly concave on the lower side. Handfuls of mud had been used in some places, apparently to cover the exposed ends of the twigs, before additional bricks were laid upon the wall. Thick clay plaster was spread over the sides, binding the individual blocks together and slightly increasing the thickness of the wall as well as rendering its surfaces more smooth. In several places, where exposed by broken plaster, single layers of flat stones separated wide courses of

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the adobe rolls. It is doubtful if there were more than two or perhaps three layers of these stones in the entire height of the wall.

Slight traces of smoke on the inner surface brings up the question of the possible prehistoric use of this structure as a dwelling. One small peg-hole, about 12 inches from the top of the rear wall, indicates the former presence of a wooden hanger, similar to those so frequently seen in both historic and prehistoric Pueblo villages. A door, large enough for easy admittance, opened toward the cave entrance.

At first thought, doorway, peg-hole, and smoke stains all suggest the former occupancy of this circular room. Doorways, however, have been noted in small storage bins, with walls constructed as were the walls of this room, in Grand gulch and White cañon, east of the Rio Colorado, and north of the San Juan. The presence of a wall-peg would be unusual if it were certain that this structure had been utilized solely for the preservation of grain—a diameter of 11 feet, however, indicates that the building may have served additional purposes. The smoke stains might easily have resulted from fires built within the walls subsequent to the abandonment of the cave, for the region has long been familiar to the Navaho and Paiute, and more recently cowboys have occupied other and larger caverns in the same cañon. Inasmuch as the floor of this structure was not exposed, it seems necessary to postpone any attempt to determine the original use of the room until it and other similar buildings have been more thoroughly examined.

As noted above, Arizona cliff-houses embracing walls made of tabular adobe bricks reinforced with grass or twigs have been reported only in the cañons forming the source of Navaho creek. That ancient house walls in this region, built of adobe strengthened with vegetal matter, are not always separable into blocks or bricks is evident from the following observation of Prof. Byron Cummings:¹

In one of the branches of Nitsi cañon south of Navajo mountain, where good workable stone was not so abundant, were found well-built houses of adobe. Here the foundations and sometimes the entire first story were of stone laid in an abundance of clay mortar, while the superstructures were of adobe. In some of these walls the clay had been mixed with grass and molded into large rectangular adobe bricks before being built into the wall, while in others the wall had been built up in horizontal sections supporting the sides with flat stone and then filling in the trough so made with clay in which grass or willow twigs were laid for strengthening material.

Professor Cummings, at present head of the department of anthropology in the University of Arizona, is more widely acquainted

¹ *Bull. University of Utah*, vol. 3, no. 3, pt. 2, p. 27, 1910.



ADOBE BRICK WITH CORE OF TWIGS AND GRASS, FROM WEST CAÑON, ARIZONA

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than any other trained archeologist with the ancient ruins of the Navaho-mountain region, therefore his statement that walls of this type have not been found in prehistoric dwellings outside of the area mentioned is of importance. It is to be regretted that the few published reports on the archeological remains of this extremely interesting region consider so sparingly the architectural details of the cliff-houses and other aboriginal habitations to be found therein. Without such reports it is not only difficult to form a proper appreciation of the ancient culture which once flourished there, but it is also impossible to compare successfully that culture with similar cultures as represented by the prehistoric ruins in other regions.

The third general type of adobe walls found in prehistoric dwellings of the Southwest is known as the caliche (calèche) or pisé construction, well represented by the ancient structures of the Gila and Salt river valleys. Of these, Casa Grande is undoubtedly the most famous, but it has been already so thoroughly described and figured¹ as to preclude the necessity of giving at this time more than a mere review of the generally accepted methods by which this and similar huge structures were erected.

Mindeleff, probably influenced by Cushing,² writes of Casa Grande as follows:³

The walls are composed of huge blocks of earth, 3 to 5 feet long, 2 feet high, and 3 to 4 feet thick. These blocks were not molded and placed in situ, but were manufactured in place. The method adopted was probably the erection of a framework of canes or light poles, woven with reeds or grass, forming two parallel surfaces or planes, some 3 or 4 feet apart and about 5 feet long. Into this open box or trough was rammed clayey earth obtained from the immediate vicinity and mixed with water to a heavy paste. When the mass was sufficiently dry, the framework was moved along the wall and the operation repeated. This is the typical pisé or rammed-earth construction, and in the hands of skilled workmen it suffices for the construction of quite elaborate buildings. As here used, however, the appliances were rude and the workmen unskilled. An inspection of the illustrations herewith, especially of plate LV [pl. v], showing the southern wall of the ruin, will indicate clearly how this work was done. The horizontal lines, marking what may be called courses, are very well defined, and, while the vertical joints are not apparent in the illustration, a close inspection of the wall itself shows them. It will be noticed that the builders were unable to keep straight courses, and that occasional thin courses were put in to bring the wall up to a general level. This is even more noticeable in other parts of the ruin. It is probable that as the walls rose the exterior surface was smoothed with the hand or some suitable implement, but it was not carefully finished like the interior, nor was it treated like the latter with a specially prepared material. . . .

¹ Mindeleff in *Thirteenth Rep. B. A. E.*, p. 289, 1896; also *Fifteenth Rep. B. A. E.*, p. 315, 1897. Fewkes in *Twenty-eighth Rep. B. A. E.*, p. 25, 1912.

² *Report Seventh International Congress of Americanists*, 1888, Berlin, 1890.

³ Mindeleff in *Thirteenth Rep. B. A. E.*, pp. 310-311.

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The floors of the rooms, which were also the roofs of the rooms below, were of the ordinary pueblo type, employed also today by the American and Mexican population of the region. In the Casa Grande ruin a series of light joists or heavy poles was laid across the shorter side of the room at the time the walls were erected; these poles were 3 to 6 inches in diameter, not selected or laid with unusual care, as the holes in the side walls which mark the places they occupied are seldom in a straight line, and their shape often indicates that the poles were quite crooked. Better executed examples of the same construction are often found in northern ruins. Over the primary series of joists was placed a layer of light poles, 1½ to 2 inches in diameter, and over these reeds and coarse grass were spread. The prints of the light poles can still be seen on the walls. The floor or roof was then finished with a heavy coating of clay, trodden down solid and smoothed to a level. A number of blocks of this final floor finish, bearing the impress of the grass and reeds, were found in the middle room. There is usually a setback in the wall at the floor level, but this practice was not followed in all the rooms.

The position of the floor is well marked in all cases by holes in the wall, into which beams projected sometimes to a depth of 3 feet, and by a peculiar roughness of the wall. . . .

It will be noticed from the above that Mr Mindeleff wrote with a degree of uncertainty and that, although convinced the walls of Casa Grande had not been constructed of bricks molded in wooden frames and afterward built into the wall, he was not absolutely sure that the builders had employed a wattled framework as a form within which the adobe walls were erected. Dr Fewkes, whose investigation of this ruin was concluded about fifteen years after Mindeleff's report was published, is even more dubious regarding the general use of such a framework, expressing his doubt in these words:¹

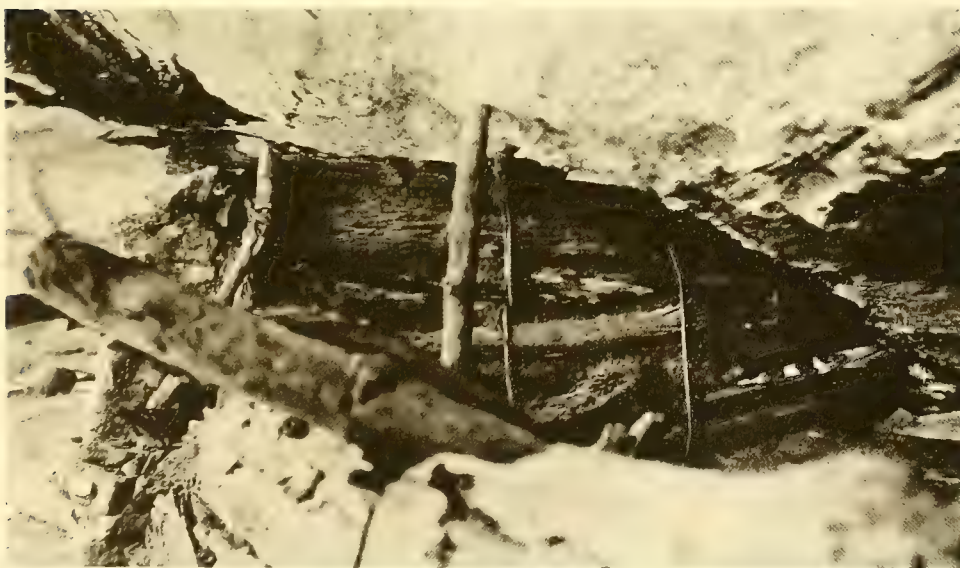
In certain walls is found evidence contradicting the theory that they were built by stamping caliche into bottomless baskets or boxes, as generally taught, and as indicated by the joints on the west side of the main ruins. At various places in the walls may still be seen masses of clay patted into shape by human hands, the imprints of which are clear. Some of these masses, which are just large enough to have been handled by one workman, were evidently dumped on the wall and subsequently were not so stamped that they lost their original shape.

Without attempting at this time to analyze the supposed methods by which the walls of the Casa Grande were constructed, it seems well to note briefly the occurrence of similar structures in adjoining valleys and then turn once more to a consideration of other, more northerly ruins, the adobe walls of which were far less massive than those in the Great Houses of southern Arizona, but which nevertheless may furnish a possible solution to the problem of construction existing in the latter.

¹Fewkes in *Twenty-eighth Rep. B. A. E.*, p. 95.



WALLS OF A SINGLE-ROOM ADOBE DWELLING AT BEAVER CITY, SHOWING COURSES OR LAYERS



LOG HOUSE IN ARMSTRONG CAÑON, CHINKED AND PARTIALLY PLASTERED WITH ADOBE

JUDD—USE OF ADOBE

Casa Grande, which is really a group of large and small structures occupying a rectangular area inclosed by adobe walls, is being protected by the National Government as the best extant example of the compound or large, many storied type of aboriginal community dwelling. The geographical distribution of such settlements has not yet been completely determined. The largest and perhaps most characteristic of the type are found in the broad valleys of the lower Salt and middle Gila rivers, but similar compounds and the remains of many smaller houses, usually not far distant from major dwellings, are distributed widely throughout the surrounding desert, in those localities where primitive irrigation seemed most feasible. With few exceptions, long years of exposure to the elements has reduced these massive structures of the Casa Grande type, as well as the smaller, outlying rancherias, to mere mounds of whitened clay, over and about which the usual fragments of stone implements and earthenware vessels may be seen. In many sections prosperous communities of citizens now flourish on the sites of extensive prehistoric settlements, whose house and garden walls have been almost completely effaced during the intensive, modern cultivation of fields once used by the builders of the Great Houses. Dr Fewkes has called attention to the fact¹ that, in many instances at least, the present American inhabitants are most numerous in those portions of the Gila and Salt river valleys which afford evidence of having harbored the densest prehistoric population. Future investigations should disclose the extent to which the fertility of the soil may have attracted the earlier culture and the degree to which easily constructed canals influenced the establishment of such settlements as that of Casa Grande.

In western Utah, scattered through broad valleys between Salt Lake City and St George, are many low, rounded mounds, accumulations of wind-driven earth over the fallen walls of single, one-storied adobe dwellings. At the present time neither the approximate number nor the general distribution of these mounds is known, but there is every reason to believe that they represent a considerable homogeneous culture which had not yet developed complex community dwellings similar to those found in other sections of the Southwest.

During the spring of 1915 it was the writer's good fortune to conduct, under the auspices of the Bureau of American Ethnology, an archeological reconnoissance of certain sections of this region. Limited excavations were made in mounds at several localities, in the hope of ascertaining not only the chief architectural character-

¹ *Smithsonian Misc. Coll.*, vol. 52, pt. 4, p. 407.

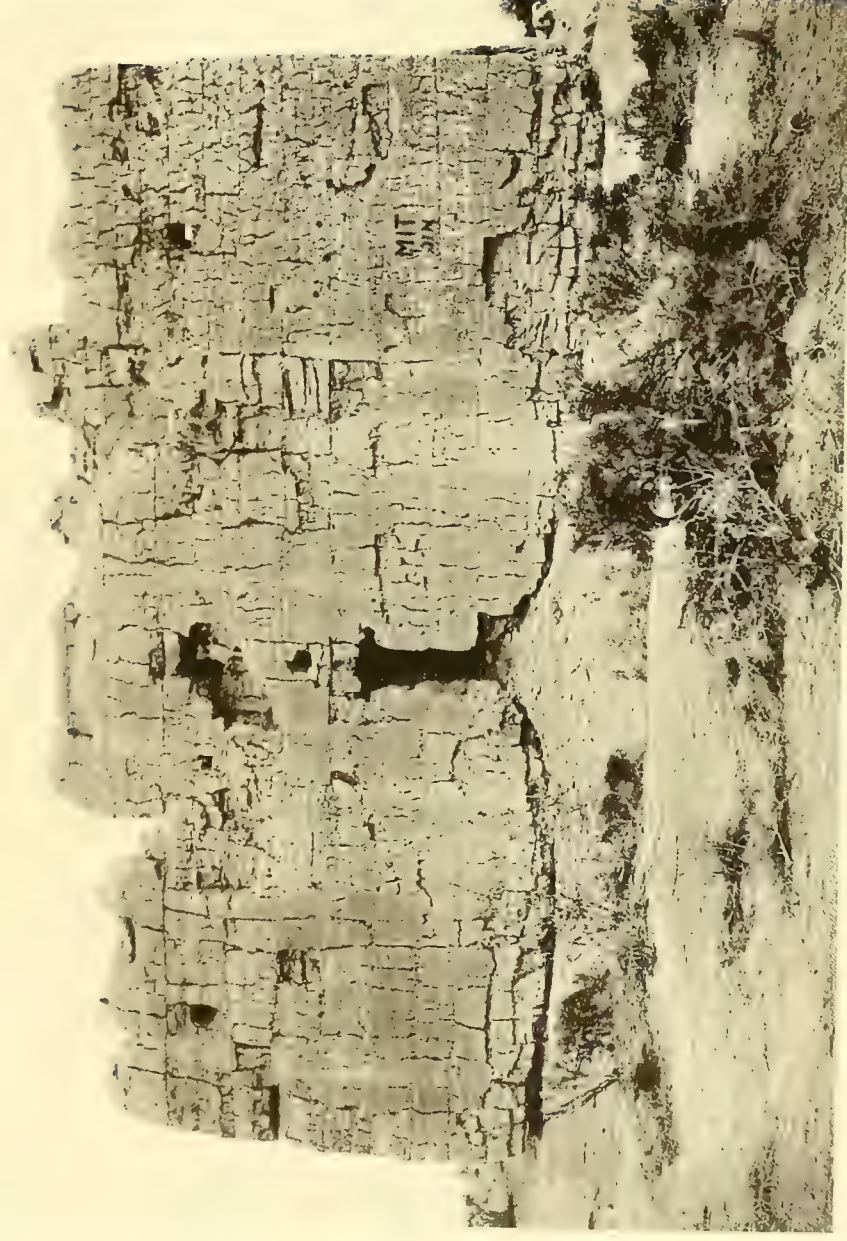
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istics of the house remains contained within them, but also in the expectation of obtaining a representative series of the minor artifacts associated with such remains. The principal results of those excavations will be set forth in a report not yet published; nevertheless it seems desirable, for the purposes of the present paper, to consider briefly a few of the observations made in one mound, which may be accepted as more or less typical of similar house sites in neighboring valleys.

On the outskirts of Beaver City, in Beaver county, one of several elevations of medium size was completely razed, exposing all the walls which had not been previously effaced, as well as certain evidences of other, less permanent habitations. In all, fifteen rectangular rooms were uncovered, in addition to a circular structure which bore several similarities to the round kivas of the San Juan drainage. Four distinct levels of occupancy were evident, each marked by a well-defined court floor, fireplaces, and at least portions of walls. The best preserved dwellings, ten in number, were found upon the lowermost level; only four of these were connected by contiguous walls. Several first-level houses contained small bins, or box-like receptacles, built against inner walls; one, in addition to a bin, possessed an olla-shaped, subterranean chamber, supposedly for storage purposes.

The walls in each of these several rooms or houses were made entirely of adobe mud, with no indication that foreign materials of any sort had been intentionally added during construction. Careful examination of both standing and fallen walls disclosed the fact that each had been formed by forcing together superposed masses of plastic clay, masses which, at the time of placement, differed both in size and in the quality of their constituent parts. The wall faces had been plastered with mud of the same nature as that used in erecting the body of the walls, thus filling and completely concealing the unevennesses resulting from the joining of large adobe balls.

Not the slightest evidence could be found indicating the use of wicker frames or forms of any kind, in the construction of these dwellings. In some instances, to be sure, the walls had been laid in courses, but the occurrence of horizontal layers seems readily explained by the very nature of the material employed. A contractor of today pours a concrete wall between forms which may be removed after the cement has set sufficiently. Forms are necessary because the cohesive properties of concrete are so low that the mixture, while still in a moist condition, is incapable of supporting any considerable weight. Although built without forms, the mud walls of the primitive dwellings near Beaver City were necessarily laid in shallow courses



SOUTH WALL OF CASA GRANDE, SHOWING HORIZONTAL LAYERS OR COURSES

JUDD—USE OF ADOBE

(pl. iv) in order that each layer might become fairly dry and hard, and thus able to resist the weight of an equal amount in a superposed course. Vertical joints occur frequently in the walls of some buildings, but it does not appear that they represent a serious desire on the part of the builders to divide each layer into blocks of even approximately uniform length.

Houses with walls which seem to have been erected in the same manner as those near Beaver City have been observed also in many sections of New Mexico and Arizona,¹ but doubt remains as to whether they possess any features not already found elsewhere.

Since adobe is most easily worked while still plastic, the faces of the mud walls in these houses were carefully smoothed during the process of construction, and it is only reasonable to suppose that the top of each new layer received like treatment at the same time. That some of these courses should not be entirely level and of uniform thickness is readily understood when one recalls that the builders were unfamiliar with even our simpler instruments of precision, and that frames or forms of fixed width were not utilized. Careful examination of the adobe walls in these houses indicates that each course was allowed to dry before an additional layer was placed upon it. The infrequent occurrence of thin layers suggests, as noted by Mindeleff at Casa Grande, an effort on the part of the builders to overcome their inability to hold straight lines in adding consecutive courses.

Almost without exception the adobe-walled dwellings in the Beaver City mounds were paved with clay mud over a layer of rounded, water-worn stones. In a few houses fireplaces with rims of adobe had been cut through the floor level. It seems certain, however, that most of the cooking was done outside the houses.

More than twenty unconnected adobe structures were exposed at Beaver City, yet none of them contained the slightest evidence that their builders had been familiar with lateral doorways or openings. Charred remains of wooden beams, and countless fragments of roofing clay, bearing impressions of large timbers, sticks, and grass, indicated that each house had been roofed in the manner most common to primitive pueblo structures in the Southwest. The frequent occurrence, usually on the surface, of thin stone discs averaging nearly thirty inches in diameter, suggests their use as coverings for roof entrances to these single-roomed, adobe dwellings.

The writer has attempted, in the foregoing pages, to remind the

¹ Bandelier in *Fifth Ann. Rep. Archaeol. Inst. Amer.*, 1884; also his *Final Report*, 1892. Hough in *Bull. 35, B. A. E.*, 1907. Nelson in *Anthr. Papers Amer. Mus. Nat. Hist.*, vol. 15, pt. 1, 1914. Morris in *Amer. Anthr.*, vol. 17, no. 4, p. 668, 1915.

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reader of the prevalent use of adobe mud in the construction of prehistoric dwellings in Utah, Colorado, New Mexico, and Arizona, and briefly to call attention to the wide distribution of aboriginal habitations whose walls were more or less completely built with adobe, either in the shape of bricks or blocks reënforced with twigs and grass, or laid in courses and exhibiting no intentional effort to add strengthening materials.

With no more than our present knowledge, it is idle to speculate on the probable relationship which existed between these prehistoric builders of widely separated but architecturally similar adobe dwellings. Primitive man easily adapted himself to his environment and readily utilized the most convenient and accessible material for the tasks which he encountered. The aboriginal use of adobe found its greatest development in those sections of our Southwest in which more desirable building materials were lacking. That the architectural results attained in the several regions bear certain resemblances to each other suggests, but does not establish, a cultural affinity between the builders of the respective structures. That they were linguistically related can be safely assumed only after a more minute comparison of the major and minor antiquities in the several regions.

UNITED STATES NATIONAL MUSEUM
WASHINGTON, D. C.

The Pottery of the Casas Grandes District, Chihuahua

By A. V. KIDDER



THE Casas Grandes district in northern Chihuahua was the center of what seems to have been the southernmost of the ancient Pueblo cultures. The writings of Bartlett,¹ Baudelier,² Lumholtz,³ and Hewett⁴ give us general descriptions of the main Casas Grandes ruin and of numerous mounds in the vicinity; in Lumholtz' book there is a series of fine colored plates of the pottery. Little, however, has been done toward a classification of the wares or an analysis of their elaborate decorative system.

The present paper, which is intended as a start in this direction, consists of a study of the Phillips collection in the Peabody Museum of American Archaeology and Ethnology at Cambridge. In it there are one hundred and ninety pieces of pottery, excavated principally at Janos, Ramos, and Corralitos, all of which are localities in the Casas Grandes region. Other collections examined, though unfortunately very hastily, were those in the Museum of the American Indian, the American Museum of Natural History, and the Fred Harvey Museum at Albuquerque, New Mexico. With the exception of the American Museum collection, which was made by Lumholtz, all these specimens were acquired by purchase in lots from local diggers and are accompanied with few or no data. It appears, however, that most of the vessels were mortuary offerings recovered from graves under the floors of the ruined houses.

The pieces fall into the following general classification:

1. Rough dark ware.
2. Polished blackware.
3. Redware.
4. Painted ware.

ROUGH DARK WARE

This class is not represented in the Peabody Museum collection, but among the Lumholtz specimens in the American Museum are

¹ Personal Narrative, vol. II, chap. xxxv.

² Final Report, chap. xiv.

³ Unknown Mexico, vol. I.

⁴ Communautés Anciennes, chap. 8.

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fragments of a few coarse, dark-brown to rusty-black vessels, apparently of olla form. The smaller pieces, being thin-walled and much blackened with soot, were probably used in cooking; the larger ones have walls nearly half an inch thick and must have been two feet to two feet six inches in height. These heavy fragments are not sooted and are probably parts of capacious jars for storage or for holding water. The paste of all the sherds is dark-brown, coarsely tempered in most instances with bits of pounded quartz; there is no slip, and while the surfaces are rough, they show no trace of corrugation.

POLISHED BLACKWARE

These pieces, of which there are sixteen in the Phillips collection, are jet-black in color and have a highly polished, lustrous surface. Technically they are identical with the well-known polished blackware made today at Santa Clara pueblo, New Mexico, and are doubtless the product of the same smothered-fire process of burning used at that village.¹ The commonest shape is a full-bodied bowl with incurved rim (pl. I, fig. 6); there are also small jars with flaring lips, bearing two horizontally perforated suspension lugs. Some of the jars have vertical flutings on their sides (pl. I, fig. 8), a feature also found on similar forms made at Santa Clara. While one small piece (C-3999) bears added ornament in the form of knobs and ridges crudely imitating the wings and tail of a bird,² and another (Mus. Amer. Ind. $\frac{3}{8} \frac{1}{9}$) is double-lobed, the blackware in general does not run to eccentric forms; this is undoubtedly due to the fact that the polishing stone, the use of which was, of course, essential for the production of the lustrous finish, could be employed only on gently curving surfaces free from protuberances or abrupt changes of angle. The above is a very good example of the influence of technical processes in the development of vessel forms.

REDWARE

Technically this ware is comparable to the black, was probably made of the same clay, and differs from it only in not having been polished so highly nor subjected to a smothered firing. The base is yellowish brown, considerably darker than the base of the painted ware; broken pieces show (in common with most other Southwestern pottery that has been burned at low fire) a central streak of gray.

¹ See Hewett, op. cit., p. 77; and for the chemistry of the process, Franchet, *Céramique Primitive*.

² This little object and another like it were apparently used as whistles. Such instruments made of pottery are not found, so far as I know, elsewhere in the Southwest.



RED, BLACK, AND PAINTED WARE

KIDDER—CASAS GRANDES POTTERY

Tempering consists of tiny, light-colored particles, presumably ground potsherds. Visible surfaces are generally coated with a rich red slip that has been polished on areas free from added ornament, handles, etc., with the rubbing stone.

Shapes (pl. I, figs. 1-5 and 7).—Unlike the black, the redware occurs in so many different shapes that a classification is practically impossible. There are several tiny bowls one to three inches in diameter; many small jars with outcurved lips, no two of which are of exactly the same form; and a few larger jars with rather fat bodies. Besides these more ordinary types there are double pots connected by hollow bars and arching handles (pl. I, fig. 1); small, plain-bodied pieces with high handles (pl. I, fig. 4); double-lobed jars; small-mouthed bottles (a shape of great rarity in the Southwest); and jars with snakes (pl. I, fig. 7), pairs of frogs (Mus. Amer. Ind. $\frac{4}{6346}$), or unidentifiable animals modeled on their sides. Tiny ladles copied evidently from gourds split lengthwise (Mus. Amer. Ind. $\frac{4}{6466}$), and small flat jars in the form of squashes (Am. Mus. $\frac{9}{4491}$, Rancho San Diego), are conscious imitations of vegetal forms.

The *decorations* of the surfaces of redware vessels are no less varied than are their shapes. A few pieces are plain polished red; on others polished areas are opposed by figures or areas left unpolished or even in the lighter colored, unslipped base clay. A dull-black paint is occasionally used to contrast with the polished red, or is applied independently in bands or roughly drawn stepped figures.

Aside from color variations there were employed a great number of different methods for texturing parts of the surfaces of vessels. Some of these were: the leaving unsmoothed of the original structural coil (pl. I, fig. 3); incising, (pl. I, fig. 1), both heavy and light; gouging; scoring with a stick; marking in small circles with the end of a reed or hollow bone; indenting with the fingernail; and scraping with a rough-edged tool, possibly a corncob. The most interesting of these devices is the leaving of the coil; this shows us how the vessels were made, and also provides an example of the retention of coiling for decorative purposes after it had been abandoned on the cooking wares.

PAINTED WARE

Technology.—Painted ware forms about 70 per cent of the collection. It is made of light-colored clay of such good quality that an outer covering or slip was usually dispensed with.¹ Where it occurs it is of a whitish color, is soft and crumbly, and often partly wears

¹ This is an unusual feature in Southwestern pottery, being found commonly only here, in the ancient Hopi ruins (Sikyatki, etc.), and in the finer black-and-white ware of the Kayenta district.

HOLMES ANNIVERSARY VOLUME

away, carrying with it the design painted over it. Tempering material is scanty, appearing in the form of fine granular bodies, which seem to consist of ground-up sherds. There are also in many pieces tiny particles of pyrites, some of which, appearing on the surface, have given rise to the popular belief that this ware was made of gold-bearing clay. The color of the vessels varies somewhat according to the amount of iron in the paste and the degree of heat developed in firing; the shades range from dead white (rare) through cream color, to an almost lemon yellow, the commonest tone being a warm yellowish gray.

The outer surfaces of the pots are well smoothed, presumably with the rubbing stone; but a glossy polish, such as is seen in the blackware, was very seldom produced.

Shapes, Jars.—By far the commonest form is the jar, a vessel of every characteristic shape, not regularly duplicated elsewhere in the Southwest (pl. 2, figs. 2, 10, 11). The pieces average about $7\frac{1}{2}$ inches high and have a capacity of $1\frac{1}{2}$ to 2 gallons.¹ There is one specimen in the collection (C-4329) that is nearly 15 inches high, but in general the divergence from the average size is slight. Typical features are: high, gently sloping upper body; rounded shoulder; full, round bottom; and point of greatest diameter set very low. The rim is slightly outcurved, ending in a plain round lip. To the rim are occasionally added a pair of horizontally perforated lugs, and many of the smaller examples have opposite pairs of suspension holes, apparently made by pushing a small reed through the rim while the clay was still soft.

A few jars do not follow the standard form, having high necks,² or globular bodies; in general, however, the type is a remarkably constant one and is not only the predominant simple form but serves as the basis, so to speak, for many of the effigy vases, which were made by the addition of various sorts of plastic ornament to the sides or rims of standard jars.

Effigy vases of one kind or another make up nearly ten per cent of all the painted specimens; this high ratio of modeled to plain pieces is not approached in any other Southwestern culture.³ A general classification follows:

1. Examples with plastic features added to the sides of standard jars.
2. Examples with heads of animals, birds, or human beings added to the rims of standard jars.
3. True effigies.

¹ The average dimensions of twenty-five pieces are: ht. 7.47"; great. diam. 8.34"; orif. 4.60".

² Lumholtz, pl. v, f.

³ The percentage of effigies in the collections of the American Museum of Natural History and the Museum of the American Indian is not quite so high as in the Peabody collection.



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PAINTED WARE

KIDDER—CASAS GRANDES POTTERY

The most characteristic pieces of the *first class* are jars which bear on opposite sides two bird-heads modeled in the round (pl. II, fig. 7), or the head on one side and a conventional tail on the other (pl. II, fig. 9). The birds are evidently some species of parrot, and the portrayal is fairly realistic, showing the heavy upper mandible, the smaller lower one, and the tongue. The representation is completed by the use of paint, the eye being indicated by a black circle containing a dot; the top and sides of the head are colored red, the throat and lower mandible black. When the tail takes the place of a second head it consists of a flat, horizontal projection with little or no attempt at naturalism. Other pieces with added sculptures in the round are

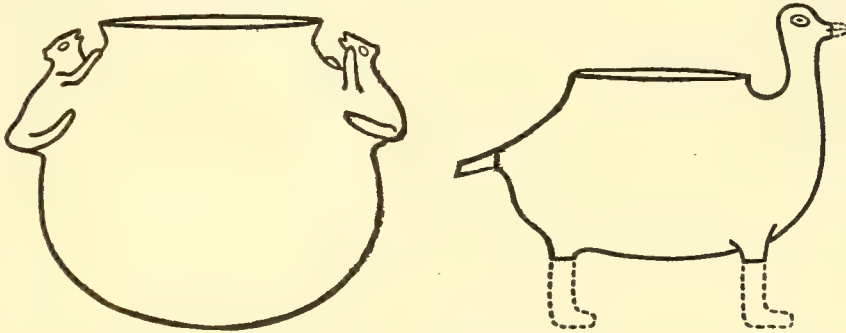


FIG. 1.—Plastic ornament.

shown in figure 1. The former has two crouching animals under the rim; the latter presumably represents a quadruped, although the head is somewhat birdlike.

Also formed by additions to standard-shaped jars but with their parts in low relief rather than in the round, are examples such as appear in plate II, figures 1 and 4. Number 4 is an arrangement of two serpents so coiled about the vessel as to cover its entire surface and end with their heads on opposite sides. The bodies and heads are formed, partly by repoussé work, partly by building up on the outside. The other example (pl. II, fig. 1) has a human face in low relief on each side of a rather stout standard jar. In this case there is no repoussé work, the features merely having been added to the rounded wall of the vessel. Brows, ears, eyes, nose, mouth, and chin are built up from the surface, pinched or modeled into some semblance of naturalism, and picked out with paint. Both the mouth and the eyes are made by cutting a shallow horizontal groove in an applied oval pellet of clay. Plate I, figure 10, shows a second specimen of this type; the eyes of this one are small, round protuberances; the pupils are indicated by dots of paint.

HOLMES ANNIVERSARY VOLUME

The *second group* of effigy vases is much more homogeneous than the first. All the pieces are made in the same way and differ from each other only in details of the representations. In construction they are very simple; half the rim of a standard jar is carried up and partly over the orifice in a kind of hood (fig. 2). The hoods are modeled, by repoussé work and by the addition of lumps and strips of clay, into surprisingly life-like head-portraits of human beings (see pl. II, figs. 5 and 8, and pl. III, figs. 1, 3, 7, 9), animals (pl. I, figs. 11 to 14), birds (pl. I, fig. 9). The photographs show better than can any description the character of these vases. It should be noticed, however, that the shape and decoration of the bodies of the pots are the same as in standard jars. Only in the pot shown in plate I, figure 14, where between regular design panels there are painted the fore-legs of the animal whose head appears on the rim, is there any attempt at introducing zoic features into the body decoration.

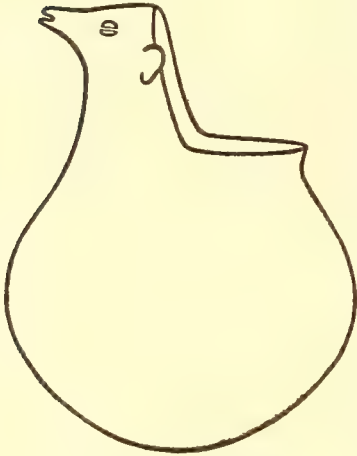


FIG. 2.—“Hood-effigy.”

The painting on the heads is a mixture of lines, dots, and bits of color, intended to heighten the realism of the representation; and geometrical elements borrowed from the regular design system and introduced to fill spaces, such as foreheads and cheeks, which would otherwise have remained blank.

The *true effigies* (third group), of which there are six in the collection, all represent human beings (pl. III). The bodies are squarish and are shaped with a heavy sort of naturalism to suggest the human torso; the division of the buttocks is indicated on the back, the breasts protrude in front, the upper parts of the legs are hollow, and the heads are built up on the rim in hoods like those of the preceding class. All other features are made by surface modeling with strips or lumps of clay (as lower legs, arms, ears, etc.), details being brought out by incisions (as in the fingers and toes), by painting (eyelashes, brows), or by a combination of the two (eyes, mouths). The figures sit with the legs straight out (pl. III, figs. 5, 8, 12), squat with the knees drawn up (pl. III, fig. 2), or with one leg doubled under (pl. III, fig. 10). All are nude, for the decorations which are placed wherever there is a flat blank space do not suggest any known form of body covering; and the realistic portrayal of the breasts, nipples, and genitals argues



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HUMAN EFFIGIES, PAINTED WARE

KIDDER—CASAS GRANDES POTTERY

against the intended representation of clothing. Various marks on the bodies and limbs, and particularly on the faces, may perhaps depict tattooing or body-painting. Of this the reader may best judge for himself from the plate, but it should be remembered that the Casas Grandes artists, like all other Puebloans, had a deeply rooted "horror vacui" and could seldom bear to leave any visible space entirely free from decoration.

There are four single and two double effigies. Of the single ones, two are male, two female. Of the male figures, one (pl. III, fig. 2) squats in a very natural attitude and holds to his mouth some object which he appears to be chewing. The lower part of the back is enlarged into a prominent hump covered by a kind of spiderweb decoration. The second example (pl. III, fig. 10) is one of the largest and best modeled; the eyes and the face-markings are noteworthy; there is no hump. The small female figure (pl. III, front fig. 5; side fig. 8) is also very well made; the larger one (pl. III, back fig. 11; front fig. 12) is decorated in black alone over an unusually light-colored base. The eyes, mouth, and nipples are touched up with black, and the top and sides of the head are painted black, presumably to represent hair. The subject is obviously pregnant.

The figures in the double effigies (pl. III, figs. 4 and 6) squat side by side and are connected by hollow bars. Each pair consists of a male and a female. The former bear on their backs distinct humps which suggest the humpbacked erotic figure of Kokopelli illustrated by Fewkes.¹

The modeling and decoration of the bodies do not differ in general plan from that of the single effigies except for the fact that the legs and sides of both males and females are painted with large black spots and that their arms and lower legs are colored black.

Some of the structural details should be noted, as they may eventually prove to have classificational value.² There were two methods of making eyes: in one a low oval mound of clay was applied to the rounded surface of the face and was crossed by a simple horizontal cut painted black (mouths were similarly represented); the second way was to make a somewhat rounder mound, outline it in black with a trailer from the corner, and indicate the pupil with a black dot. The ears are curved ridges touched up with paint. Hands and feet were made plain and then so gashed with a sharp implement as to bring out the separations between fingers and toes.

Bowls.—The large, shallow food-bowl, so common in most South-

¹ *Twenty-first Ann. Rep. Bur. Amer. Ethnol.*, pl. xxv.

² Cf. Spinden, *Archeology of Salvador*, *Amer. Anthr.*, n. s., vol. 17, 1915, p. 469 and fig. 74.

HOLMES ANNIVERSARY VOLUME

western districts, is not represented in any of the collections examined. Casas Grandes bowls are all very small and generally deep. Of the twenty-two examples in the Phillips collection the largest is 8 inches in diameter and 4 inches deep; there is an almost perfect gradation in size from this example to ones not more than an inch across. The deep bowls are ornamented only on the exterior, the shallow ones both inside and out. The general scheme of decoration follows that of the jars, although the difference in shape produces a somewhat different arrangement of the elements.

DECORATION

The decoration of the commonest single form, the jar, may be taken as the standard; other vessels, be they effigies or bowls, are ornamented with what are evidently parts of jar designs or with single elements taken from them.

Pigments.—The painted designs are usually polychrome, black and red figures on a light background. The black paint, though occasionally of a clear sharp tone, more often has a rusty-brown tinge. The pigment on a few pieces shows a slight luster or semi-glaze, and two specimens (C-4403, C-4272) bear designs in well-marked dark-green glaze not distinguishable from that of certain Little Colorado vessels. Whatever the nature of the normal black paint, it evidently flowed freely and evenly from the brush, for the lines of the decoration, even where long and very thin, are singularly sharp and well sustained.

The red, of a rich dark-scarlet shade, is almost always a secondary pigment used to fill spaces inclosed by black lines, to set off black elements and in general to enrich or liven up the pattern. (For colors Lumholtz' fine plates should be consulted.) It is softer than either the black or the surface of the ware and is consequently often partly rubbed and worn away.

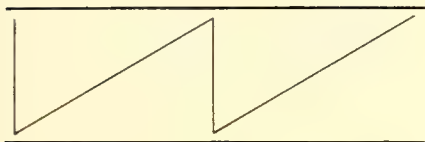
Design.—In looking at a collection of Casas Grandes pottery the qualities that first strike one are the richness of the colors and the delicate accuracy of the delineation. The richness of color is due to the mellow, old-ivory tints of the background and the harmonious combination of the dark reds and subdued blacks of the decoration. The accuracy of delineation is emphasized by the use of numbers of long, thin framing lines, drawn with surprising precision and most evenly spaced. These framers must be considered first, as their production was the initial step in the decoration of the vessels; they served to lay off the fields of design and to build the framework, so to speak, for the completed pattern.

The surface of a standard Casas Grandes jar is generally treated

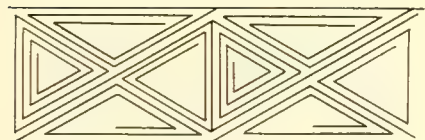
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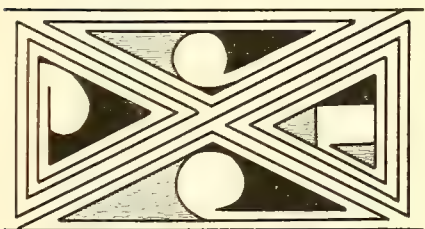
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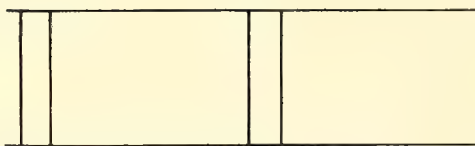


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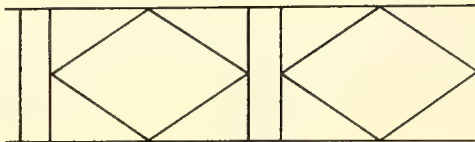


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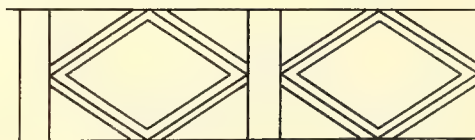
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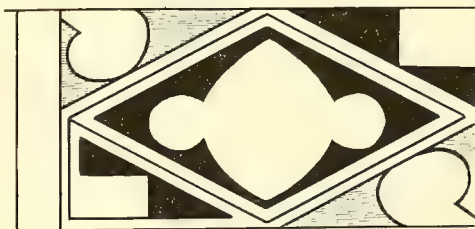
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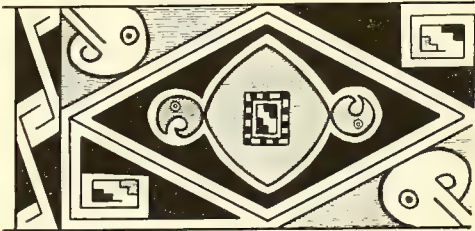
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STRUCTURE OF RECTILINEAR DESIGNS

KIDDER—CASAS GRANDES POTTERY

as a single broad horizontal band, extending from just below the out-curve of the rim to a point well below the shoulder. (See pl. II, figs. 10 and 11.) It is inclosed at top and bottom by pairs of unbroken



FIG. 3.—Rectilinear pattern.

framing lines.¹ The upper line of the upper pair and the lower line of the lower pair are always free; the inner lines of the two pairs often serve as base-lines from which spring secondary framing lines that cut the band into its various subdivisions.

Rectilinear Style.—Figure 3 shows the whole decoration of a typical jar. It will be noticed that the ornament repeats itself once. This duality in design is very strictly adhered to in all phases of Casas Grandes art. For reducing the original band-like decorative surface into the smaller fields only three methods are at all commonly practised.



FIG. 4.—Type I.



FIG. 5.—Type II.

The *first*, shown in the above-mentioned figure, in the skeleton cut (fig. 4) and on plate IV, figure 1, consists of drawing horizontal lines on the two opposite sides of the vessel and connecting their respective tops and bottoms with diagonals. In the *second* method the preliminary bars are drawn as before, but the two resultant spaces, instead of being subdivided by diagonals, are filled by diamond-shaped figures as shown in the skeleton cut (fig. 5) and on plate IV, figure 2.

Designs of the *third* class are laid off by drawing about the vessel a two-pointed zigzag, producing four triangular fields (fig. 6, and pl. II, fig. 11). In some very elaborately decorated vessels the preliminary, laying-off lines are so

¹ The "line-break" does not, so far as I know, occur on any Casas Grandes vessel.

HOLMES ANNIVERSARY VOLUME

expanded as to become intensively ornamented bands (pl. IV, fig. 2, *e*; pl. II, fig. 2).

It is clear that the object of the preliminary dividing up of the decorative space is to reduce it to a number of triangular spaces. This done, there follows a secondary laying off, which is merely a carrying on of the same process (pl. IV, fig. 1, *c*), and still smaller triangular fields are produced; these contain the actual units of the design.

These *elements* (or units of design) are of three types: opposed stepped figures (pl. v); single or double scrolls (pl. v); the club-shaped element (pl. VI). The plates of photographs should also be consulted.

The *opposed stepped* figures are, of the three, the most typically Southwestern. In general they are distinguishable from other Puebloan elements of the same kind by: (1) the fact that the two figures are in opposed colors (red and black); (2) the fineness and accuracy of the delineation and the sloping character of the "steps"; (3) by the unusual practice of mounting both figures on a single "stalk" (pl. v, figs. 1 and 3).



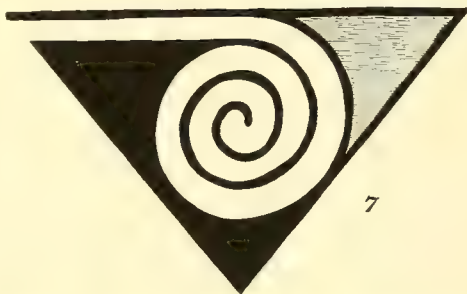
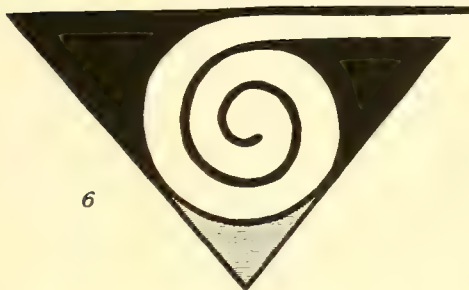
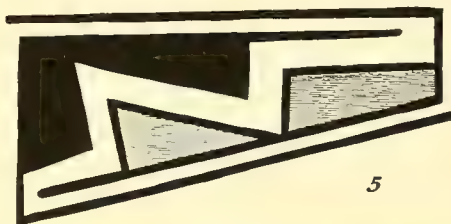
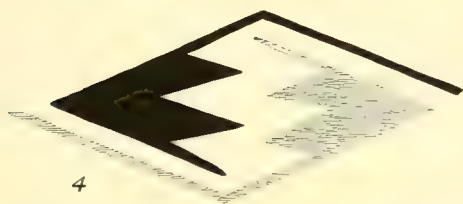
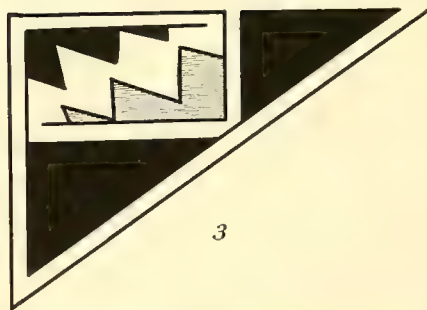
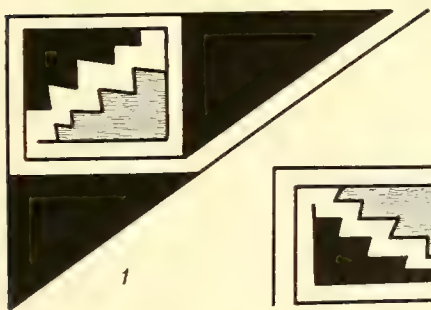
FIG. 6.—Type III.

Of the *scroll*, the figures (pl. v, figs. 6 and 7) give a better idea than can be gained by description. In its most characteristic and abundant form (pl. II, fig. 10) it is the

core, so to speak, of a triangular field and consists of a single line curving in on itself. This arrangement is, so far as I know, not found elsewhere in the Southwest. Interlocking scrolls arranged in band form (pl. v, fig. 8) are much less common; this type, as distinguished from the first, is found on the pottery of practically every Puebloan district.



FIG. 7.—Serpent. (Museum of the American Indian.)



ELEMENTS IN RECTILINEAR DESIGNS

KIDDER—CASAS GRANDES POTTERY

For an understanding of the *club-shaped element*, recourse must be had to the drawings and photographs (particularly pl. VI), as a clear verbal description of it is quite impossible. Its simplest and also its commonest form is illustrated by plate VI, figures 1 to 5 inclusive, where it consists of a club-like object surrounded by a curved open space. Figures 6 to 9 inclusive are almost the same, but have a line (6, 7) or an ornamented band (8, 9) entering the open space and curling about the central figure. In these two series the emphasis is on the black or positive part of the design; in the rest of the examples, however, the emphasis is shifted, the black parts, particularly the club-shaped elements, no longer form the positive part of the

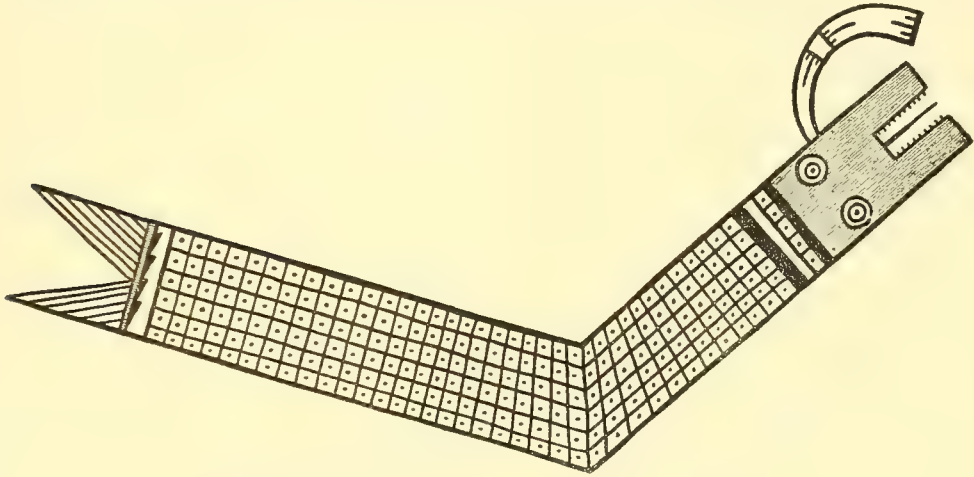


FIG. 8.—Serpent. (Museum of the American Indian.)

design but serve merely so to cut the fields as to bring out the features of a design in the base color. This method may be called negative or background drawing. Of the negative drawings on plate VI, some (12, 13, 14, 19, 21, 22, 24) obviously represent life forms; others (15, 16, 17, 18) may be merely decorative.

To discuss all the questions raised by this interesting group would require more space than is available. One line of inquiry may, however, be indicated. To begin with, it can hardly be doubted that all the figures on plate VI are closely related. Some of them convey no impression of naturalism; others are fantastic, but none the less convincing, representations of life-forms; a third lot (11, 12, etc.) are intermediate. Furthermore there are on Casas Grandes pottery truly naturalistic drawings of birds, human beings, and serpents (see pl. VII), in the make-up of which certain elements from our "club-complex"

HOLMES ANNIVERSARY VOLUME

play a not unimportant part. (Compare tail of bird, pl. VII, fig. 2, with pl. VI, figs. 13, 14, 23, etc.; plume of serpent, text fig. 9, with pl. VI, fig. 9, etc.)

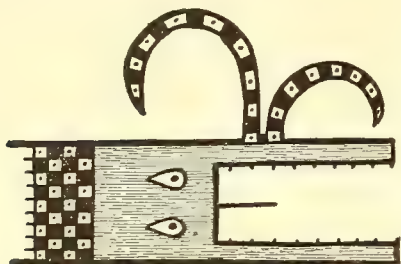


FIG. 9.—Serpent. (American Museum.)

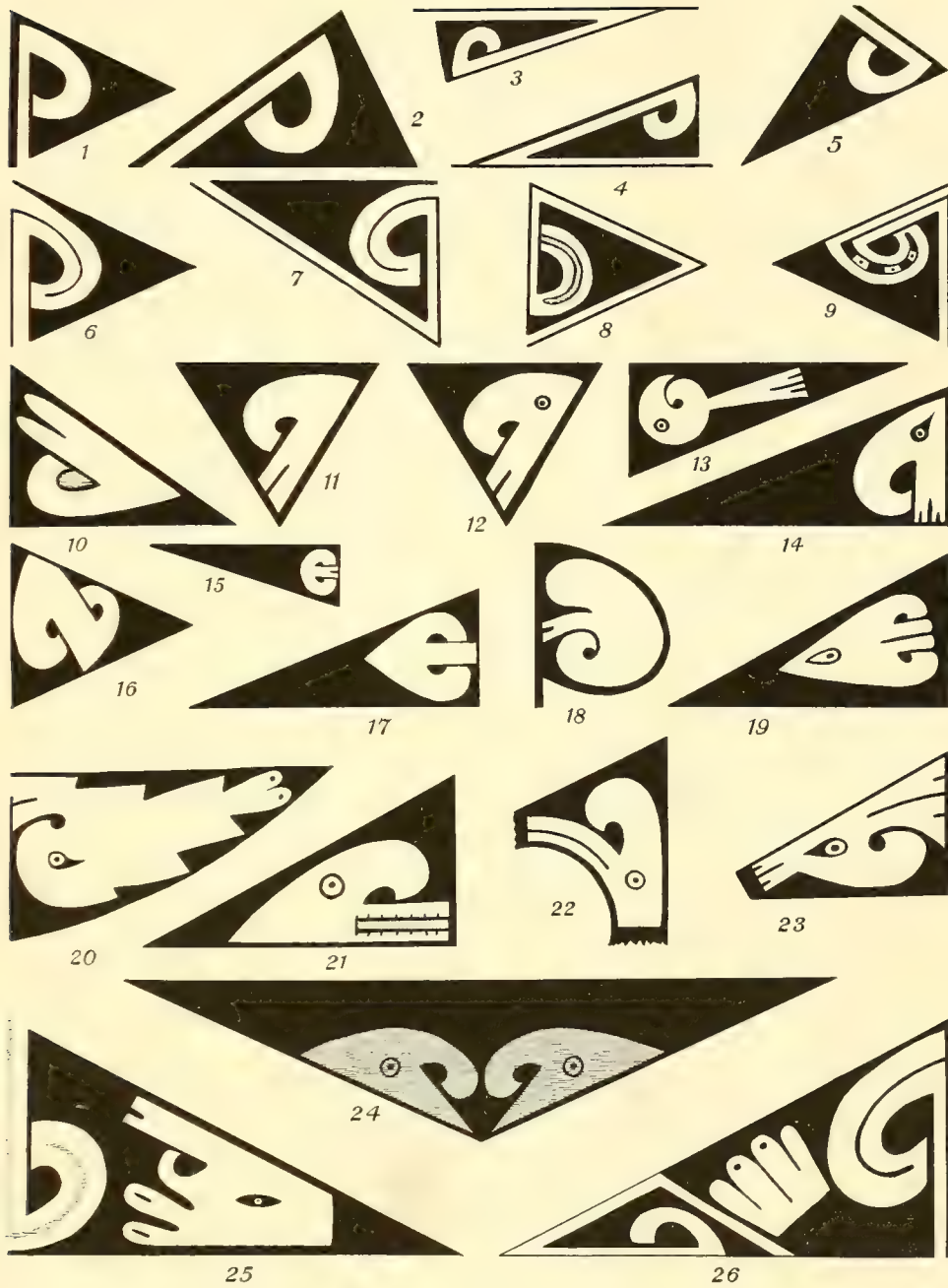
Here, then, we have a very complete series from passably free naturalism (pl. VII, figs. 1 to 5), through more and more highly conventionalized forms (pl. VI, figs. 12 to 22), to true geometric elements (pl. VI, figs. 1 to 11), which last would thus appear to have been reduced to "part for the whole" representations of the bird (by means of the beak or the tail), or the plumed serpent (by the plume).

That we should recognize in this series a case of conventionalization is, to my mind, very doubtful, because nowhere in Southwestern art is there any evidence that such a conventionalization has ever taken place. On the contrary, wherever, as in the case of Upper Rio Grande pottery, a true developmental series can be studied, the trend seems to have been uniformly in the reverse direction, namely, toward realization from geometric origins.

I am inclined to think, therefore, that the club-like element is geometric in origin, derived in some way yet to be worked out from the scroll or possibly from the stepped figure; and that its lifelike forms are due to the discovery that the addition of eyes and the indication (by short entering lines, pl. VI, figs. 13, 14, etc.) of tail-feathers would produce quaint and pleasing designs which resembled birds and reptiles familiar in their life or mythology. The peculiar and, in the Southwest, almost unique practice of negative or background drawing may perhaps eventually be traced to the use of derivatives of the club-like element.

The questions just discussed cannot, however, be settled with any reasonable certainty until we know something as to the sequence of pottery types in the Casas Grandes region. The difficulty with the collections at present available is that they probably contain both early and late specimens, and we have no way of determining which is which.

Small *triangles with crooked appendages* (pl. V, fig. 9) are often found on the vessels with rectilinear decoration. They seldom form integral parts of the designs as do the three elements just considered, but serve to fill narrow bands (pl. II, fig. 1) to supply edgings to larger ornaments, or to occupy small spaces upon the various types of effigy



CLUB-LIKE ELEMENT AND ALLIED SYMBOLS

KIDDER—CASAS GRANDES POTTERY

vases (pl. III, figs. 1, 5, etc.). They usually occur in pairs interlocking, in series along a line, or in double series with a current design filling the interspaces between them (pl. v, fig. 9). A triangle with an appendage of one sort or another drawn from its apex and in line with its longer side is a unit used almost universally in Southwestern decoration. This particular form, however, seems to be restricted to the polychrome ware of the lower Gila,¹ to the later Little Colorado wares,² and to the red Pajaritan pottery of the upper Rio Grande.³

Life forms are considered here because they seem always to be associated with designs of the rectilinear style.

*Plumed Serpents.*⁴—Painted representations of these mythical monsters are not common. There are: one (pl. II, fig. 4) in the Peabody Museum; four in the American Museum, and three in the Museum of the American Indian. The Peabody specimen has been described and figured with the effigy vases; on it the serpents cover the whole surface of the vessel and are executed in relief. The other examples are painted flat. In most cases there are two serpents, one on each side, the heads and tails nearly meeting. Each serpent is bent in the middle so that the two together form (or the single serpent if there be but one) a zigzag about the middle of the vase (cf. figs. 7 and 8, and Lumholtz, p. 94 and pl. II). The rest of the decorated surface is occupied by the familiar elements of rectilinear design.

The figures themselves form narrow bands occupied by geometric decoration, the most constant feature of which is one kind or another of dotted checkerboarding. The figures here given, together with those of Lumholtz just referred to, and those in Spinden's *Maya Art* (p. 241), illustrate all the serpents now in accessible collections. Though they differ in details their similarities are obvious and need not be listed here. The common association of the bird with the serpent on these vessels (cf. Lumholtz, pl. II) is interesting.

Birds are all produced by negative drawing and are of fairly life-like appearance. As they usually occur on the same vessels as do the serpents there seems to have been some connection between the two in the minds of the artists. Plate VII shows a representative series of them, figure 3 being from a pot in the Deseret Museum, Salt Lake City. They are always fitted into rectangular or triangular panels. While the species cannot be identified, it seems clear the representations are of some small crested bird like the California quail rather

¹ Fewkes in *Twenty-eighth Ann. Rep. Bur. Amer. Ethnol.*, figs. 46, 47.

² See plates in Fewkes, *Twenty-second Ann. Rep. Bur. Amer. Ethnol.*

³ Kidder in *Memoirs Amer. Anthr. Asso.*, vol. II, no. 6.

⁴ For the first notice of this form on Casas Grandes pottery, see Saville in *The Archaeologist*, II, pp. 291-293. See also Spinden, *Maya Art*, p. 241.

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than the parrots that are presumably portrayed in the round on effigy pots (pl. II, fig. 7) and painted in at the corners of certain diamond-shaped fields in rectilinear class 2 designs (pl. V, fig. 2, *e*; pl. III, fig. 9).

Human Figure.—Only one instance of the representation of the human form has come under my notice.¹ It occurs in the form of two similar panels in background drawing on opposite sides of a standard jar (pl. VII, figs. 5 and 7). The presence of a form of the club-like element as a filler in one of the examples (fig. 7) should be noted.

Curvilinear Decorations.—These are distinctly uncommon, but the

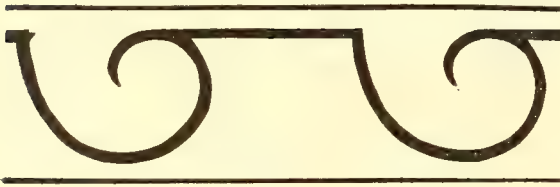


FIG. 10.—Curvilinear framework.

few examples which do occur conform closely to a single type. The skeleton cut (fig. 10) and the photograph (pl. II, fig. 6) illustrate the style more clearly than can be done by verbal description. The heavy black delineating line with

its curved terminations, and the contrasting with it of hatched ribbons, both strongly suggest the ornamentation of certain black-and-white pitchers from the Tularosa-Socorro district of southern New Mexico.

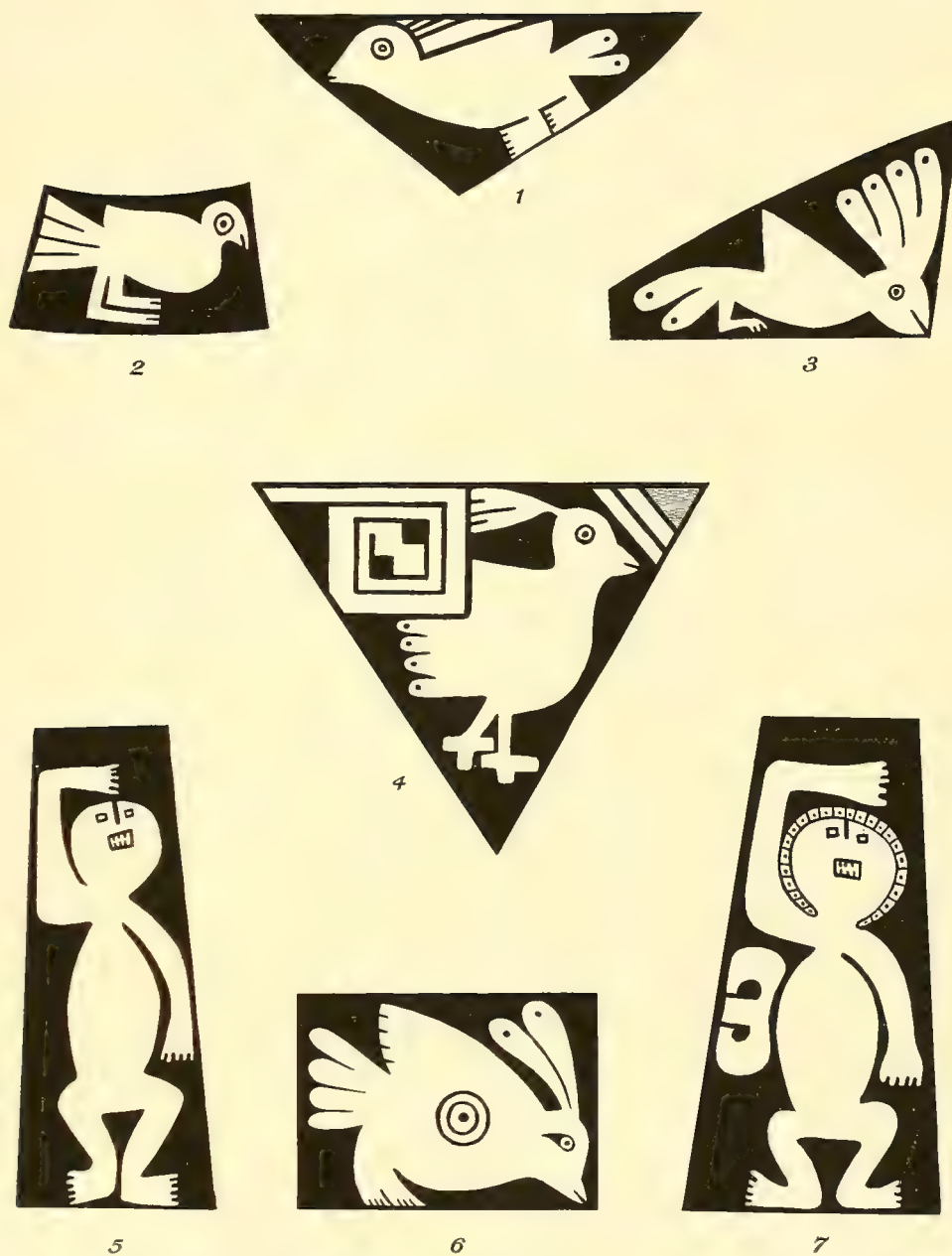
Gila-like Vessels.—Plate II, figure 3, shows one of four or five specimens in the Casas Grandes collection that in color and ornamentation seem to show analogies to the polychrome ware of the lower Gila.² The painted figures are much more coarsely executed than is usual at Casas Grandes; red is employed as a kind of secondary background; and the minor elements, such as the fringed line, the hatching, and the stepped figures do not conform to like elements in the local style. As the clay appears to be the same as that used at Casas Grandes and the line-break (always present in Lower Gila decoration) is missing, we are led to believe that these pieces are copies rather than importations.

RELATIONSHIPS

Because of our limited knowledge of the ceramics of northern Mexico, this paper, of necessity, has been descriptive rather than comparative. Some remarks on the place of Casas Grandes ware in the general archeological scheme may, however, not be out of place.

¹ Aside from the peculiar anthropomorphic serpent figured by Spinden, loc. cit.

² A piece is also figured by Lumholtz (op. cit., pl. III, *e*).



BIRD AND HUMAN FIGURES IN "NEGATIVE DRAWING"

KIDDER—CASAS GRANDES POTTERY

It is safe to say that the group belongs to the so-called Southwestern culture rather than to any Mexican culture at present known. This is shown by the structure of the vessels and the prevailing simplicity of their shapes (lack of complex forms, tripod types, the flat dish, etc.). The decoration also is Southwestern in general plan, as is evidenced by the use of bands with framing lines; by the formality of arrangement and the regular repetition of elements. Of the elements themselves, the interlocking scrolls, the triangles with bent appendages, and particularly the opposed stepped figures, are all typically Southwestern.

Qualities foreign to the bulk of Southwestern pottery are: the prevalence of effigy vases and the erotic tendencies of some of them; the use of negative drawing as a means of decoration; and probably the appearance of the plumed serpent.

Whether the club-like element and its derivatives should be considered as of local origin or as an importation from the South depends on whether it is believed to be the product of a broken-down naturalistic system or to be of geometrical origin. In the former case it is possibly Mexican; in the latter it may perfectly well be Southwestern.

We conclude, then, that Casas Grandes pottery is a highly specialized and somewhat aberrant sub-group of the great Southwestern family which, owing to its position on the southern frontier of the Pueblo country has been considerably influenced, probably during the formative period, by the ceramic art of Mexico.

Beyond the fact that Casas Grandes ware is Southwestern, we cannot at present go; we cannot as yet, for example, trace any genetic relationship between it and any other Puebloan group. Of contact relationships, however, we do get a few hints. As was mentioned in describing the decoration, certain vessels were found to be strongly suggestive of Lower Gila (Casa Grande) ware. Furthermore there is in the Museum of the American Indian a vessel ($\frac{A}{\pi 294}$) typical of the Lower Gila style in clay, shape, decoration, and even in the line-break, a feature not found at Casas Grandes even in the Lower Gila-like specimens just mentioned. In the Peabody Museum there is from Los Guanacos, lower Gila, a pottery parrot-head (H-3867), broken from its parent vessel. This specimen came, without much doubt, from such a Casas Grandes bird-pot as that shown on plate II, figure 7. Too much reliance should not be placed on single finds of this sort, and it is of course possible that the jar in the Museum of the American Indian (being in a purchased collection) may have actually been found on the lower Gila. I think on the whole, however, that it is safe to

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assume that the two cultures were contemporaneous, and held at least a limited intercourse. This presumption is further borne out by similarities in architecture, in shellwork, and in stone implements (the straight-backed, three-quarter grooved ax is practically confined to these two cultures).

The newly discovered Mimbres group of pottery¹ seems also to be in some way connected with that of Casas Grandes, although there are so few data available that no certain conclusions can be reached. The remarkable naturalism of the Mimbres art is apparently a purely local efflorescence, neither parent to nor derived from the more limited naturalism of Casas Grandes, yet certain figures on Mimbres vessels² and the occasional use of negative drawing³ strongly suggest intercourse between the two groups.⁴

As to the age of the Lower Gila and Mimbres cultures we know no more than we do about that of Casas Grandes. Dr Fewkes, basing his belief principally on a study of the house types, considers the Mimbres culture to have been a very early one. In this I am inclined to differ with him and to think that the Mimbres ware will be found to be a late and highly specialized form of the widespread black-and-white group.

The age of the great-house culture of the lower Gila is also unknown, but from its high development we are led to believe that it is fairly late in the general archeological history of the Southwest.

All that can be said at present, then, is that we have reasonable grounds for connecting the Casas Grandes group with other groups farther to the north. We may, in turn, be able to connect them with those of the Rio Grande and the Little Colorado, whose actual chronological positions are little by little becoming known to us. We must in any case have more data: from the Casas Grandes district itself; from the regions to the south of it in Old Mexico; and particularly from the lower reaches of the Rio Grande, where, if anywhere, we shall find the data necessary to connect these most interesting remains with those of the rest of the Pueblo area.

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¹ Fewkes in *Smithsonian Misc. Coll.*, vol. 63, no. 10.

² Fewkes, *ibid.*, figs. 27, 28.

³ *Ibid.*, fig. 18.

⁴ The Mimbres river drains into the Chihuahua basin.

Thoughts on Zuñi Religion

By A. L. KROEBER



FUNDAMENTAL line of cleavage divides the elaborate mass of Zuñi ritual into two parts: one communal, the other fraternal in the manner of our secret lodges. The communal organization substantially excludes women, but embraces every male in the tribe from the age of ten up. To it alone belong the *kiwwitsiwe*, as the Zuñi call their kivas; and to it also belong all the *ashiwanni*, or priests, who have the care of fetishes—*ettowe*—and pray at outdoor shrines. The public ceremonies are dances performed by disguised impersonators of gods with the purpose of bringing rains.

The fraternal organizations, which number thirteen, are joined voluntarily by women as well as by men. They comprise directors and other officials, but no priests. They maintain their headquarters, and meet, in the living rooms of dwellings, and have no connections whatever with the six kivas. They rarely frequent shrines, but erect indoor altars. They heal the sick, they juggle, they enter as recognized adjuncts into certain of the communal ceremonies. They do not have as their primary object the production of rain. The hold of this purpose on the Zuñi mind is so strong that it has to some measure invaded the fraternity rites; but it is obvious from the cast and scope of these that rain-production is foreign to their general tendencies. Finally, with very few exceptions, masked representatives of deities do not appear in the fraternal rites.

Not all of these traits appear among the *Apitlashiwanni*, the 'bow-priests', whose society is one of warriors, and in many ways in definite ancillary relation to the communal organization; nor among the *K'oshikwe*, or 'cholla-cactus people', whose body is largely but a reflected repetition of the bow-priests. But the eleven other societies stand apart from the communal scheme.

Of course there are endless mannerisms of national religious style that appear in both of these two currents. But the few fundamentals that have been enumerated would suffice to demonstrate the diversity, even if this were not clear to the consciousness of the Zuñi. Mrs Stevenson has not summed up in any single formal statement the breadth of the gap. But she has given it significant substantial expression by entirely dividing, in her great book, her account of the tribal rites

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from that of the fraternities, and interpolating between them pictures of non-religious arts and social customs.

Among the other Pueblo Indians a similar distinction is made, though it has been less sharply pressed home by depicitors of their civilization. For the Sia, and therefore the Keresan people in general and no doubt the Tanoan also, Mrs Stevenson has herself presented the evidence,¹ though in a manner rendering difficult a thoroughly adequate comprehension of the import of the separation. In his numerous writings on the Hopi, Dr Fewkes several times refers to the difference in character between the masked and unmasked dances, and to related matters. It is true that the Hopi do not observe the line of demarcation exactly as the Zuñi do. Thus, their kivas are associated with the fraternities, and certain of their society rituals display a much more primary rain-making intent, and a correspondingly greater public cast, than any at Zuñi. But these variations are only partial; and it is undeniable that much of the Zuñi cleavage of religious organization can be traced among the Hopi also.

That this cleavage is a conceptual and largely a conscious one, does not of course make it original in Pueblo religion. It may have been so; or again, it may have developed only gradually out of a former more economical state of undifferentiation. There is no doubt that the dualism which pervades the modern Pueblo system of ceremony, is one of partial repetition, and that it is connected with the evident tendency toward exacting elaboration. This inclination can be imagined as having been lacking at one time; but we do not know. It does seem probable that the Zuñi have carried out the duplication more rigorously in the last two centuries than any other Pueblo people: first, because of the exceptional and complete concentration of the tribe or speech group into a single town, a circumstance almost predestined to emphasize the solidary communal aspects of life; and then because of the long continued presence of the Christian church. On the Rio Grande, this influence was strong enough to invade, and in some cases largely to disintegrate, the native ceremonials. In remote Zuñi this did not occur; but the coexistence of Catholicism, backed as it was by the authority of a dominant race, must have exerted a constant pressure that resulted in inward readaptations of the home cults. Something like kivas must have persisted at all times; but they certainly did not flourish with the openness and freedom of those of the Hopi. Under the enforced restriction of function, it is conceivable that they were preserved for the use of the most sanctified

¹ *Ninth Ann. Rep. Bur. Amer. Ethn.*, p. 116, 1894.

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kernel of the religion; so that, when on the withdrawal of the Catholic priests the fraternities were able once more to rear their heads as they desired, they found themselves dissociated from these characteristic structures. Whether these things really happened, remains to be determined from comparative inquiries and possibly by documentary researches; but the probability of some effects of this sort can hardly be doubted.

In their essential freedom from Spanish influence, the Hopi have certainly preserved their ancient religion more purely than any other Pueblo community; yet it would be rash to conclude that their rituals present the truest picture of Pueblo religion as it was four hundred years ago. Geographically, they are the outposts of the group to which they belong. Many things point to even the Zuñi being but the advanced line, in most matters, of a civilization whose hearth, at the discovery, lay on the Rio Grande; and with all their superior fortune in preservation, the Hopi may have preserved only that phase of Pueblo culture that was the least typical. These are considerations that must be carried in the minds of future investigators.

The Zuñi form the names of their fraternities by adding the suffix *-kwe*, 'people', to the designation of an animal, plant, or object: as *Tlewwe-kwe*, 'wood or staff people', *K'oshi-kwe*, 'cholla-cactus people', *Hallona-kwe*, 'ant people'. In some cases the etymology of the radical is uncertain: *Newe-kwe* is translated 'galaxy-fraternity' on the authority of Cushing; but the ordinary word for the milky way is *yuppia-tlanna*, and few if any Zuñi can translate *newe* literally.

The generic name for fraternity or religious society is *tikkyanne*, plural *tikkyawe*. From this is the term *tikkyilli*, more fully *tikkyillonna* or *tikkyilliponna*, 'he who has a fraternity', 'a society member',—which includes *illi*, 'to have'. This is Mrs Stevenson's *tikili*, 'fraternity'. Now, the tribal organization headed by the priests is the *Ko-tikkyanne*, and each of its adherents is a *Ko-tikkyilli*. Mrs Stevenson's *Kotikili*, 'mythologic fraternity' ('members of the mythologic fraternity' would be etymologically more accurate), gives the connotation rather satisfactorily, but is literally inexact. The best rendering into English of *Ko-tikkyanne*—a thoroughly true one is impossible—is 'god-fraternity'. The *Ko-tikkyilli* are the adherents to the *tikkyanne* of the *kokko*, the gods.

The word *kokko* denotes both less and more than the English "god". It does not seem to be applied to Awonawilona, to the sun, the Earth mother, and other personifications. It is perhaps definitely restricted to those gods that are represented by masks. It includes, on the other hand, these masks and the dancers that wear them. In short,

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the significance of the term is ritual rather than mythologic or philosophic. It is the exact equivalent of Rio Grande and Hopi *kachina*, a term that the Zuñi know but regard as "Mexican" and refuse to employ.

Incidentally, Mrs Stevenson did Cushing an injustice when she accused him of confounding the words for "god" and "raven". Cushing wrote the Powell alphabet, in which open *o*, as the Zuñi vowel is, is represented by circumflex *â*; so that his *kâkâ*—not "*kaka*"—is wholly correct. Mrs Stevenson merely changes the style of orthography when she writes *kokko*. In fact she is herself in error when she distinguishes *kokko*, god, and *kaka*, raven (or crow); the two seem to have an identical pronunciation and may be but one word.

The monosyllabic radical of *kokko* is *ko-*, and this appears as an element in many other compounds besides *Ko-tikkyilli*.

Ko-k'okshi, 'good gods', are the rank and file of the masked dancers in the "standard" costume, that is, those wearing ordinary masks lacking special names.

Ko-e'le, 'god girls', are the "standard" female impersonators.

Ko-mossonna, 'god director', better: 'director of the masked dancers', is a Deer clan man high in authority in the communal rituals.

Ko-tlahma is the *tlahmanna* or transvestite god, illustrated on Mrs Stevenson's forty-fourth plate.

Ko-tluwallawa, also *Ko-tluwalla* and *Ko-tluwayyala*, is the name of the sacred lake near the junction of the Zuñi river with the Little Colorado, the home of the *kokko* and the abode of the dead of the Zuñi. The word means 'god-town', from *tluwallanna*, or *tluwallawa*, 'town, city, pueblo':

Ko-llowissi, the name of the sacred horned or plumed serpent, cannot be analyzed, but appears to contain the same root *ko-*.

Ko-yyemshi are the "mud-heads" or masked clowns, corresponding to the Hopi *Tachuktu*, the Sia *Koshairi* and *Querranna*. The word *Koyyemshi* suggests *oyyemshi*, husband, but the etymology is only a guess. The initial syllable of Keresan *Koshairi* renders it possible that this name is of Zuñi origin: the *r* might be the Rio Grande equivalent of another sound. If this conjecture should be confirmed, the leading part in the development of the "mud-head" or "delight-maker" feature of Pueblo religion would have to be attributed to the Zuñi. It is unfortunate that we do not know more of Keresan and Tanoan speech: a native etymology might in this case quite reverse our understanding of the probable direction of a historical current that, for the nations in question, was of some magnitude.

The Sia *Koshairi*, or rather the analogous *Querranna*, constitute a fraternity; the two together also guide, receive, and attend the *ka-*

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*chinas*¹ much as at Zuñi. The line between the tribal and fraternal schemes of organization is therefore more or less effaced at this point among the Keres. At Walpi, Dr Fewkes speaks of the *Tachuktu* as an introduced order of no great antiquity. The Zuñi *Koyyemshi* absolutely belong to the *Kotikkyanne*. It is to be said, however, that they differ in every function from all other participants in the rites of this organization. They are selected for an entire year, to appear in all ceremonies of that period, according to the clan affiliations of their fathers and their own fraternity membership, irrespective of their kiva adherence; they act as a solidary body of ten; and virtually, therefore, form a small society of annually changing membership subsidiary to the *Kotikkyanne*, and comprised within it.

It is also of interest that according to all of Mrs Stevenson's accounts the *Koyyemshi* are partially but rather closely duplicated by the unmasked members of the *Newekwe* fraternity in actions and even in appearance. There is no trace of confusion in the Zuñi mind; but the same idea has clearly been worked over by them twice in the two connections.

All of this raises the question whether the "mud-heads" may not have formed a true fraternity in the pre-Spanish religion of the Pueblos; a fraternity that, like all others, had of course some measure of authoritative recognition in communal religion, and that gradually came to assume, most pronouncedly among the Zuñi, at least in one of its forms, the character of a well defined unit in the specifically tribal part of organized religion.

The names of the ten *Koyyemshi* have been given by Mrs Stevenson,² but sometimes connotatively rather than exactly. Thus *Awan Tachu* does not mean 'great father' but 'their father', namely, *Siwulutsiwa*, the father of the other nine. *Posoki'i* hardly means 'small mouth', or *Muyapona* 'small horns': small is *ts'anna*, short *konni*, mouth *awwati-nna*, horn *sayya-nna*.

Mrs Stevenson puts in the first class of Zuñi deities only *Awona-wilona*, "the supreme life-giving bisexual power, who is referred to as He-She, the symbol and initiator of life itself, pervading all space." This sounds almost like a definition of mana. It is obviously not a translation but an attempt to interpret. The epithet contains the elements *aw-*, plural, *onna-we*, 'roads, paths, or ways', and *illi*, 'to have, possess, or hold'. The fullest form appears to be *Ho'n-aw-onna-w-ill-onna*, "he who owns our paths", or "he who holds the ways for us". This approximates Cushing's "Holder of the Trails of

¹ Stevenson, *Sia*, pp. 71, 117.

² Page 235.

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Life”;¹ but the element for “life” is not expressed. That *Ho’n-awonna-willona* is not always thought of as an unpersonalized penetrating essence is shown by the fact that he is at times referred to as being in the sky. On the other hand, it is doubtful whether the epithet implies an individualized personality. Bandelier in his picture of ancient Keres life in *The Delight Makers* mentions repeatedly “the holders of the paths of our lives.” The element *aw-* in the Zuñi word is a plural prefix; whether it refers to the ways or to the multiple holders thereof, is not certain.

The word *shiwanni*, or in the orthography here used, *shiwwanni*, plural *ashiwwanni*,—the hereditary keepers of rain-fetishes, prayers for rain, directors or performers of all the more esoteric activities of the tribal religion, and the ultimate rulers of the pueblo—has usually been translated “rain priest”. “Priest” may do, in spite of certain implications foreign to Zuñi institutions. “Rain priest” is a substantial enough rendering, since the prime intent of the whole existence of a *shiwwanni* is the production of rain. As a translation, however, it would be false; nothing meaning “rain” is contained in the word. The actual etymology cannot be given, but seems in all probability connected with *shi’we*, ‘flesh’, ‘meat’; or *shiwwi*, ‘Zuñi person’, as in the plural *ashiwwi*, ‘the Zuñis’.

It is not to be forgotten, however, that *The Delight Makers*, whose scene is laid among Keresan people of speech utterly unrelated to Zuñi, refers to the *shiwana*, the “spirits of the fetishes” or rainmakers, apparently in the sense of the Zuñi *uwannami*, the rain-making celestial deities.

The native title of the Zuñi lieutenant governor is *tsippolowe shiwwanni*, ‘Mexican priest’, that is, priest for the Mexicans. He is expected to speak Spanish, and to have particular charge of relations with Spaniards and Mexicans. At dances it is his particular business to see that no Mexican is in the pueblo.

The civil governor is known either as *annutla* or *tapupu*. The former seems to be a native word of unknown derivation; it may possibly be connected with *anni-kwa*, ‘to know’. The latter recurs in Keresan as *tapop*, in Bandelier’s orthography, and is therefore perhaps a loan-word in Zuñi.

The word *pekwinna* is often translated ‘deputy’ by Mrs Stevenson, and at other times has been rendered ‘sun priest’. Both terms convey a rather satisfactory idea of the functions of the office. *Pekwinna* however means ‘speaker’, from *pe-yye’a*, to ‘speak, *pe-nna*, a word. The *pekwinna* of a *shiwwanni* or other religious official is the one

¹ Cited by Fewkes, *Amer. Anthr.*, VIII, 124, 1895.

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authorized to speak for him. In addition, there is one *pekwinna* who has no superior. This is the *shiwanni* who has charge of the ceremonial calendar. He is 'speaker' not for any human authority, but for the sun itself, *yattokya an pekwinna*; and is usually referred to simply as the *pekwinna*. This is one of the most conspicuous and one of the three highest individualized posts in Zuñi life; the others being the head *pitla-shiwanni* or bow-priest, and the *kyakkwe-mossiye* or *kyakkwe-mossonna tlashshi*, the head of the six *kyakkwe-amossi*, or 'house-masters',—the six ranking *ashiwanni* and the supreme font of authority in Zuñi.

Mossiye or *mossonna*—the two seem to mean very nearly the same thing—has about the significance of 'director'. The Zuñi sometimes translate it by 'boss'. It occurs in *kyakkwe-mossiye*; *ko-mossonna*, also mentioned before; and in a number of other combinations, such as *ne-mossi*, the director of the *Ne-we-kwe* fraternity. Mrs Stevenson mentions the *pamosonokia*, or *pa-mossonn-okkya*. This is literally 'Navaho-director-woman'. She is the female assistant or associate of the bow-priest who has charge of the scalps kept by the Zuñi. Since the traditional foe was the Navaho, *Pachu*, plural *Apachu*, *pa-* in *pa-mossonn-okkya* stands literally for 'Navaho' or 'enemy' rather than 'scalp'. So, too, the *A-pitla-shiwanni* or society of the bow-priests is sometimes spoken of as *pa-tikkyanne*, 'Navaho fraternity', that is, the society of those having to do with the enemy.

These examples illustrate the Zuñi tendency to reduce to a monosyllabic radical the first element in compounds, whatever its original form. *Pachu* is itself a false singular from *Apachu*, construed as a plural on account of its appearing to contain the prefix *a-*, although probably nothing but the Spanish word 'Apache', which originally was applied to the Navaho as well as to the tribes we call Apache. The true Apache the Zuñi now designate by other names, such as *Willats'ukwe*, White Mountain, and *Chishshekwe*, San Carlos. The raider par excellence of the Zuñi being the Navaho, the generic *Pachu*, *Apachu*, was retained for him. The majority of tribal designations used by the Zuñi are similar adaptations of Spanish or Indian names. Thus, *Mukwe*, plural *Amukwe*, the Moqui or Hopi; *Kuhnukwe*, Coconino or Havasupai; *Pimakwe*, Pima; *Kummanchikwe*, Comanche; *Hemushikwe*, Jemez; *Ts'i'a'akwe*, Sia (compare *Ts'i'a'awa*, the so-called 'sacred' dance plaza in Zuñi); *Kochutikwe*, Cochiti; and the Hopi villages *Ullewakwe*, Oraibi; *Shummahpawa*, Shungopovi; *Ship-pailemma*, Shipaulovi; *Mushshailekwe*, Mishongnovi; *Watlpiye*, Walpi; *Shiwinna-ye* (the only exception, 'Zuñi place'), Sichumovi; and *Tewwanaye* or *Tewwakwe*, the Tewa town of Hano.

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If any doubt remains as to the readiness of the Zuñi language to incorporate foreign names—of course in a pronounceable form—and then to treat them freely as if they were native, such suspicion may be dissipated by the first-position stem or prefix *me-*. This is 'American', altered to *mellikan*, shortened habitually to *mellik*, and in composition reduced to the first syllable.

A number of foreign terms are used in Zuñi religion, and the other Pueblos appear to be equally receptive to Zuñi influences. The evidence along this line will be of the greatest importance in tracing the origins and spread of the various elements of Pueblo religion, once the several languages are well enough known to permit of trustworthy analyses. For instance, a Zuñi ceremony with a name that is meaningless in Zuñi but bears an appropriate significance in Tewa, can with certainty have its inception attributed to the latter people. Thus the much greater prominence of the *Sha'lako* ritual at Zuñi than among the Hopi, as well as traditional statements by the Hopi, make it highly probable that this ceremony came from the Zuñi; if etymology could corroborate this likelihood, it would thereby give surety. Determinate study of intertribal terms like *Kachina*, *Shumaikoli*, *Yebichai* (a Navaho word, used also by the Zuñi), *Sayyatl'ia* (Zuñi: 'blue horn', found also at Sia), *Hehea*, *Chakwena*, *Natashku*, *Humis* or *Hemishikwe* (i.e., "Jemez"), and, in mythology, *Poshaiyanki*, *Shipapu* or *Shipapolima*, *Matsailema* or *Maasewe*, *Uyuyewi* or *Uyuuyewe*, *Kupishtaya*, must therefore prove exceedingly fruitful.

It is clear from the few instances here cited that specific and incontrovertible evidence on the interconnections of all the Pueblos is available as soon as their languages are properly drawn upon. It may be only a coincidence, but it may also be of the greatest significance, that the Zuñi and Keres words for "clan", *annota* and *hanutch*, and the Zuñi and Hopi terms for "ceremonial chamber", *kiwwitsi-nna* and *kiva*, are similar. Only philological study can decide. That the Pueblo civilization was substantially the same in every town, has always been assumed; it begins to be evident that a great part of it has been borrowed back and forth in the most outright and traceable manner. The history of the cults and institutions of any one of these peoples therefore simply cannot be understood without a knowledge of the customs of the others: the problem is in its very nature a comparative one. And ethnology can make only halting or erroneous advances toward the solution as long as it remains aloof from thorough acquaintance with the Pueblo tongues.

A number of the names of gods personated in Zuñi dances are analyzable. These prove mostly to be descriptions of the masks worn,

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and not designations of the attributes or functions of the deities. Thus ceremonial predominates over the conceptual or imaginative element of religion in this as in so many other cases. Thus, besides *Sayyatl'ia*: *Sayya-tashsha* ('long-horn'); *Yammu-hakto*, 'carry yammu on the head'; *Mulluk-takkyä*, 'butterfly-frog'; as in Mrs Stevenson's plates 16, 54, 55, 72.

The relation of the Zuñi to their *kokko*, and of the Pueblos in general to the *kachinas*, is a peculiar one, that has never been well formulated because apparently not accurately understood. The Zuñi believe that their dead, at least so far as they are *kotikkyilli*, join the *kokko* at *Kotluwallawa*. They also pray for rain to the dead as well as to these gods. The *kokko* themselves are nothing but Zuñis, in a sense.¹ As the ancient people crossed the river, the mothers dropped their pinching and biting children, who turned into tadpoles, frogs, turtles, and other aquatic animals, descended to the 'god town' in the sacred lake, and there at once became the *kokko*, with *Pautiwa* and *Kyaklu* at their head. The Zuñi also state that formerly the *kokko* visited the living people in person; but as they returned, "took Zuñi girls with them." The masked human dancers were therefore substituted.

The terms "ancients" and "ancestor worship" thus have considerable justification as applied to the *kachina* gods and the *kachina* cult. At the same time, these English words express but a small part of the native implications, and connote much that is foreign to the Pueblo mind. It is not only the "ancients" but the dead of all time, including those of the last year, that join the *kokko* and are *kokko*; and a phrase like "ancestor worship" can only be employed with the strictest caution against any suggestion of East Asiatic ideas. It is the dead as a generality that are prayed to by the tribe, rather than the individual "departed" (as the Zuñi call them) by their survivors or descendants. If there are two systems of beliefs and feelings about the ancestral dead that in some respects are as far asunder as the poles, it is those of the Chinese and the Pueblo Indians. Connections are much clearer with Mexico, ill-organized as our knowledge of native religion in that country is. We are only at the threshold of an understanding of the thoughts and emotions that to a Zuñi cluster about his gods and his dead.

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¹ Stevenson, p. 33.

Right and Left in Osage Ceremonies

By FRANCIS LA FLESCHÉ



THE habitat of the *Wazházhe* Indians, better known as the Osage tribe, was in the country now included in the states of Missouri and Kansas. Like many of the tribes which made their homes along the Missouri river, the Osage maintained themselves partly by hunting and partly by cultivating the soil.

The purpose of this paper is to set forth some of the peculiar thoughts of the ancestors of the Osage, when the ancient leaders were organizing the people as a tribe. These thoughts are expressed in the rituals, ceremonial forms, symbols, and myths that have been transmitted orally through a long line of generations.

Early in this formative period the Osage had become imbued with the idea that all forms of life proceeded from the united fructifying powers of two great forces, namely, the sky and the earth, and that the continuity of all forms depended absolutely on the unity of these two. This idea the ancient leaders figuratively expressed in the complex organization of the tribe and in the rites that were formulated as a means by which to perpetuate the tribal life. They divided the groups of families composing the tribe into two great divisions, one to represent the sky and to be known by the name *Tsízhú*, and the other to represent the earth, and to be known by the name *Hó'ga*. By the interlacing relations between these two great divisions the leaders united the people into one ever-living body.

As the inseparable unity of the sky and the earth made possible the continuity of the life that proceeded from them, so must the two great tribal divisions be inseparably united to make possible the continuity of the tribal life. This idea of the bringing together of the two great symbolic divisions of the tribe to form one body was, in its turn, likened to a living man. This symbol was further carried out by the ceremonial positions of the two great divisions in the tribal rites. The left side of this man, who faced the east, is the *Tsízhú* division, representing the sky, and his right side is the *Hó'ga*, representing the earth with its land and water.

In performing the ceremonies connected with the tribal rites, the members of the two divisions sit facing each other in two parallel lines extending east and west; this arrangement is always observed



A PORTABLE SHRINE THAT BELONGED TO THE MIK'TN OR SUN GENS
(U.S. National Museum)

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whether the place of meeting be in a wigwam or outdoors. The space between the two parallel lines represents the space between the sky and the earth, through which lies the path traveled by the sun.

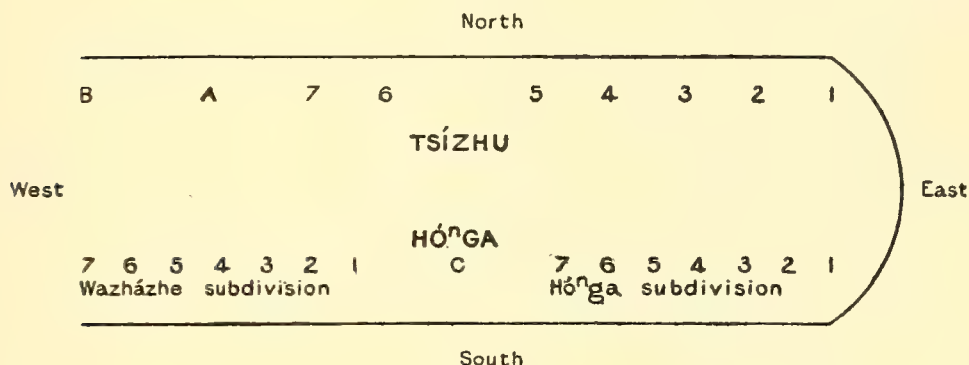


Diagram of the dual division of the Osage

This symbolic arrangement of the positions of the two great tribal divisions governs the movements in ceremonies and the places the symbols must occupy—as to whether they belong to the right side or to the left. For example, when a candidate is to be initiated into the mysteries of the tribal rites, two pairs of symbolic moccasins are made, one to be worn by the initiator and the other by his official messenger. While the two great divisions are represented in the use of these two pairs of moccasins, another symbol, denoting the living unity of the tribe, appears in connection with the making of the moccasins, namely, that of a young buffalo bull. The knife employed in cutting the material for the moccasins is spoken of as a "horn" of this symbolic buffalo. If the ceremony is being given by a gens on the *Hóⁿga* side, the knife is spoken of as the "right horn", and if given by a gens of the *Tsízhu* side, the knife is spoken of as the "left horn" of the buffalo.

The downy feather, an under-tail covert of the eagle, worn by the initiator in the ceremony, symbolizes one of the sun-pillars, sometimes seen on both sides of the sun as it begins to rise above the horizon. This feather is spoken of as the sun-pillar at the right or the one at the left side of the sun, according to the side of the tribal division to which the initiator and the candidate belong.

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CEREMONIAL ORDER OF OSAGE GENTES¹

HÓⁿGA

Hóⁿga Subdivision

1. *Waçábeton* (Black Bear).
Waçábeçka (White Bear), *Shóka* (Official messenger).
2. *Iⁿgthóⁿga* (Puma).
Hiⁿwáxaga (Porcupine), *Shóka* (Official messenger).
3. *Opxon* (Elk).
Ta He Shabe (Dark-horned Deer), *Shóka* (Official messenger).
4. *Móⁿinⁿkagaxe* (Earth Maker).
5. *Hóⁿga Ghezhe* (Spotted Eagle).
6. *Xutha* (Golden Eagle).
7. *Hóⁿga Zhíⁿga* (Little *Hóⁿga*).
Ibatse Tadse (The Gathered Winds).
- C. *Hóⁿga Utanoⁿdsi* (Isolated *Hóⁿga*, the Earth).
Moⁿhiⁿçi (Arrowpoint), *Shóka* (Official messenger).

Wazháze Subdivision

1. *Wazháze çka* (White *Wazháze*, or Real *Wazháze*).
Iⁿgihóⁿga Ni Moⁿtse (Puma in the Water), *Shóka* (Official messenger).
2. *Kek'in* (Turtle).
Bak'a Zhoigatha (Cottonwood Tree People), *Shóka* (Official messenger).
3. *Mikelthesedse* (Cat-tail).
Káxe Wahuça (Crow), *Shóka* (Official messenger).
4. *Wátsetsi* (The Star that came to the Earth).
Xuthá Paçoⁿ Zhoigatha (Bald Eagle People), *Shóka* (Official messenger).
5. *Oçúgaxe* (They Who Make the Path Straight).
Moⁿshódsemoⁿiⁿ (Those Who Walk in a Mist), *Shóka* (Official messenger).
6. *Tatháxi*, or *Taçiⁿdseçka* (Deer People).
Wadsúta zhiⁿga Zhoigatha (Small Animal People), *Shóka* (Official messenger).
7. *Ho Inikashiga* (Fish People).
Enoⁿmiⁿdse toⁿ (They Who Alone Own the Bow), *Shóka* (Official messenger).

TSÍZHU

1. *Tsízhú Wanoⁿ* (Elder *Tsízhú*), also *Wakoⁿ'da Noⁿpabi* (The God Who is Feared by All, the Sun).
Wabaxi (meaning lost), *Shóka* (Official messenger).
2. *Çíⁿdse Agthe* (The Wearers of the Wolf Tail on the Scalp-lock).
Shóⁿge Zhoigatha (Wolf People), *Shóka* (Official messenger).
3. *Pétoⁿ Toⁿga Zhoigatha* (Great Crane People).
4. *Tsedóga Iⁿdse* (Buffalo Bull Face People), related to the *Tsízhú Wanoⁿ*.
Tseákoⁿ (meaning uncertain), *Shóka* (Official messenger).
5. *Mik'in Wanoⁿ* (Elder Sun People).
6. *Hoⁿ Zhoigatha* (Night People).
Tapá Zhoigatha (Deer Head or Pleiades People), *Shóka* (Official messenger).
7. *Tsízhú Uthuhage* (*Tsízhú* Who are the Last in the Order).

¹ This order of the Osage gentes was given by Shóⁿtoⁿçabe to Miss Alice C. Fletcher in 1896.



SHO'NO'CABE

An elected chief of the Osage tribe, grandson of "Tchong-tas-sab-bee", mentioned by George Catlin in his book on the North American Indians, Vol. II, page 42, published in 1841. Sho'no'cabe died October 17, 1910.

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TSI HASHI

(Those Who were the Last to Come)

A. *Nika Wakoⁿdagi* (Men of Mystery, or Thunder People).

Xoⁿdse Watse (Cedar Star), *Shóka* (Official messenger).

B. *Thóxe* (archaic name for the buffalo bull).

At the initiation of a candidate into the mysteries of the tribal rites, the officers and the candidate, in ceremonially approaching their place within the ground marked out for the ceremony, observe certain rules as to the right and left. If the initiator, his assistants, and the candidate belong to the *Hóⁿga* side, they will go from left to right, around the eastern end of the place to the western end, cross the space and enter on the *Hóⁿga* or right side. If they belong to the *Tsízhu* division, they will go around the eastern end of the place, from right to left, to the western end, cross the space and enter on the *Tsízhu* or left side.

On arriving at their place at the eastern end of the ground, the men sit side by side in the middle, facing the west. They put down on the ground before them a bag of woven buffalo-hair (pl. 1). This bag was made with reference to the position of the two great divisions, for when the bag was being made for one of the gentes of the *Hóⁿga* division, the hair used is taken from the right shoulder of the buffalo, and when the bag is made for a gens of the *Tsízhu*, the hair is taken from the left shoulder.

There is also a right and a left end to the buffalo-hair bag, indicated by the mouth and the flap, which must always be placed toward the west, with the flap on the upper side of the bag.

Within the buffalo-hair bag is another bag made of deerskin, which is so placed that its mouth and flap must be in the same position as the outer bag, so that it also may be said to have a right and a left end.

Inside the deerskin bag is a case made of woven rush. This also is placed so that its mouth and flap may be toward the west. This case, however, has other marks to distinguish the right end and the left. The uninitiated would not think to look for these marks, but one who has been properly instructed would examine the fastenings at an end of the case, and, finding there six, would say, "the left end", and on examining the other and finding seven fastenings, he would say, "the right end".

These three envelopes constitute a portable shrine, which they are in reality. Each of the envelopes is called *waxóbe*, a sacred article, because it has been made ceremonially and for the purpose of protecting the sacred bird-hawk which forms the central figure of all the war rituals and ceremonies. The sacred bird-hawk is placed within

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the case made of woven rush with its head toward the end having the seven fastenings, and its feet toward the end having six. This bird represents life and death—life for the Osage and death for all their enemies. The upper side of this woven rush case represents the sky and the lower side the earth. The inner part of the case, where the bird-hawk lies, represents the space between the sky and the earth, into which all life comes and never departs except by death.

The portable shrine used in the initiatory ceremonies is the property of the gens to which the candidate belongs, and at the close of the ceremony is transferred to the keeping of the initiate, who puts it in a given place in his home. This place has reference to the positions of the two great tribal divisions, so that on entering a house in which there is a portable shrine, if it is seen hanging at the left of the door, as one faces the door from within, it will be known that the master of the house belongs to the *Tsízhu* division; if the shrine hangs at the right of the door, then it will be known that he belongs to the *Hónga* division.

So also as to the sacred burden-strap of the mistress of the house, which is regarded by some of the people as even greater in sanctity than the sacred bird-hawk. If the gens in which the mistress of the house was born belongs to the *Tsízhu* division, her burden-strap hangs at the left of the door. Where master and mistress both belong to the same division, the shrine and the burden-strap will be seen hanging side by side on the same side of the door. Nor is this the only instance in which the positions of right and left are considered with reference to the sacred burden-strap. When the burden-strap is made, the material is taken from the left side of the buffalo skin, if the woman for whom it is intended belongs to the *Tsízhu*; if she be of the *Hónga*, it is taken from the right.

In one of the seven degrees of the Osage rites there is a spoken part in the ritual relating to the gourd rattle used for beating time to the music of the songs. There are two versions of this spoken part: in one the gourd rattle symbolizes the head of a man of the enemy; in the other, the head of a puma. The gravels within the gourd that is shaken to make the sound, symbolize the teeth. When a *Hónga* recites this spoken part, he will say, "The seeds of this rattle [meaning the gravel] are the teeth of the right jaw of the man." If a *Tsízhu* recites it, he will say, "The seeds of this rattle are the teeth of the left jaw of the man." The handle of the gourd represents the right or left fore-arm of the man, this being determined by the division to which the man reciting the words belongs.

When a man goes through the rite of fasting, he is forbidden to

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lie down to rest during the seven days' period of fasting. He is, however, permitted to sit down, and when he does so, he must sit facing the south, which is the right side of the division, if he be a *Hóⁿga*; if he is a *Tsízhu* he will sit facing the north, which is the left side.

In the ritual of two of the degrees of the Osage tribal rites there is a spoken part that is mythical in character and relates to the limitation in the number of certain prescribed warlike deeds to be performed by a man in order to win rank as a warrior. This story is in two parts and has two animals for its heroes. It should be remembered in this connection that the division on the right side, symbolizing the earth, is divided so as to represent the dry land and the water. One of the animal heroes is the black bear, a land animal; the other is the beaver, a water animal. The subdivision toward the east on the earth side, representing the dry land, retained the name of the whole division, *Hóⁿga*, and that toward the west, representing water, was given the name *Wazházhe* (see diagram, page 279).

The story of the black bear, in brief, is as follows: After rushing madly about, when in due season, during the month of September, the hibernating spell seized him, he came to a cave and made his way into the opening, being careful to enter at the right side. He found a comfortable place within and lay down to sleep for seven lunar months. When he awoke, he felt of his body and found that he had lost all his fat, and that his skin hung in wrinkles upon his bones. He dragged himself to the entrance of his cave, taking care to keep to the right side. As he stood in the open air he heard all around him the singing of birds and the humming of insects, he also heard the sighing of the mild winds among the branches of the budding trees and saw the mists of spring floating in the air. When he felt revived by the life-giving air of springtime, he moved forward and took seven steps, making seven footprints in the soft earth. Turning back, he looked thoughtfully at his footprints and then said, "When my children, the *Wazházhe* and the *Tsízhu*, go forth against their enemies who dwell toward the setting of the sun, they shall strive to win honors, equal in number to these seven footprints." Then he moved back to the opening of the cave and across to the space on the left side, and strode forward, making six footprints in the soft earth. As before, he turned back and looked at the marks of his feet upon the ground, and said, "When my children, the *Wazházhe* and the *Tsízhu*, go forth against their enemies, who dwell toward the setting of the sun, they shall strive to win war-honors, equal in number to these six footprints." (Note the correspondence of these numbers to the

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fastenings of the ends of the woven rush case—seven on the right end and six on the left.) The bear, revived in strength by the warm, wavering atmosphere of spring, went on. The growing grasses rustled musically at every step he took. At last he came to the banks of a river, where stood the house of the beaver. There his story ends, and that of the beaver begins.

To the middle of the river the beaver swam and made his way up the stream, against the strong current, rippling the surface as he pushed forward. He came to a bend of the river where, on its low banks, a willow sapling stood; this he cut so that it fell toward the setting of the sun, where dwelt the enemies of the Osage. He carried the sapling to his house and laid it at the door, the butt-end resting within the entrance at the right, and then he said: "This act of mine is not without a purpose. My children, the *Tsizhu* and the *Hónga*, shall use this sapling to count their war-honors." Again and again he repeated this act, bringing each time a sapling from a bend of the river until he placed seven at the right side of the door of his house. He continued his work in the same manner and brought home six more saplings which he placed at the left side of the door of his house. Thirteen honors in all each warrior of both the right and the left side must risk his life to win in order to count. Seven and six are the numbers fixed by the black bear and the beaver, and these are the sacred numbers.

In the ceremonies of two of the seven degrees of the Osage rites, this story is pictured by the placing of a black-bear skin and a small mound of earth, to represent the beaver's house, in front of the place where the warrior who is to recount his war-honors must sit. The candidate who is being initiated conducts the warrior to this seat and then brings to him the thirteen willow saplings with which he is to count. These saplings are divided into two parts, one containing seven and the other six. In bringing the two bundles of saplings, the candidate grasps in his left hand the bundle containing seven, and in his right that containing six, so that when placing them before the warrior, who sits facing the east, the seven saplings will be at his right and the six at his left. The bunches of saplings are so arranged that the butt-ends of the six rest on the butts of the seven.

In fixing the number of war-honors to be won by the warriors, the sky was not outdone by the earth, for it took from the sun thirteen of its rays—seven from the right side and six from the left—for the use of the warriors in counting their warlike deeds.

It may be well to mention here that on the further division of the two great divisions into smaller groups, the left division was

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divided into seven sacred fireplaces, each having a separate name representing some object of nature. To the right division fourteen sacred fireplaces were given—seven for the part representing the dry land of the earth, and seven for the part representing the water part of the earth. The twenty-one sacred fireplaces stood for groups of families—divisions in a tribe that are termed *gentes* or clans by ethnologists.

As has been stated, the Osage of the olden time, when forming their tribal organization, divided the families of the people into two parts to represent the interdependent sky and earth, finally they molded the two parts into an inseparable body and made it to symbolize a man standing in a position facing the sun. They did not leave him there like an immovable statue, but attributed to him a mind capable of thinking and a body having the power of motion, as shown in the movements of the people when performing the great war ceremonies.

In organizing a war-party to include the warriors of both of the two divisions, certain preliminary ceremonies are performed in connection with the selection of the leader, the selection of a man to act as ceremonial director for him, and the appointment of the commanders and other officers of the party. When these ceremonies have been concluded, the people pull down their wigwams and, dividing themselves into two great divisions, reset them in a ceremonial order, that is, in two great squares with a dividing avenue extending east and west. It is at this movement that the change of the position of the symbolic man takes place: instead of facing the east he now faces the west, thus bringing the *Tsízhu* division, which represents the left half of his body, to the south, and the *Hónga* division, which represents the right half, to the north side.

After setting up the wigwams in ceremonial order, other ceremonies are performed—the preparation of the sacred charcoal with which the warriors paint themselves when about to make an attack, the making of the feathered crooks for the commanders, and the making of the rawhide straps for tying the captives if any should be taken: seven for the *Hónga* and seven for the *Tsízhu*. The straps for the *Hónga* are made of the skin of the right hind leg of the buffalo, and those for the *Tsízhu* are made of the skin of the left leg.

On the day the warriors are to depart, they move out of the camp, going westward, and when they have gone about a quarter of a mile they halt for the final ceremonies. The warriors sit in two groups with a space extending east and west between them, the *Hónga* at the north and the *Tsízhu* at the south. The old men who are to remain at home form two half-circles around the warriors, those of the *Hónga*

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at the north and those of the *Tsízhu* at the south. When all have settled down, the old men form two processions, each marching around the two groups of warriors, the *Hóⁿga* going around by the left and the *Tsízhu* by the right, singing the final songs of the ceremony. When this is done the leader steps forward a few paces, in the line of the space dividing the warriors, and recites three rituals, standing with his face toward the west. He then takes from a pile of grass, placed at his feet by a servant, a handful, and holding it toward the sky, makes a prayer. Four times he does this, at each time laying down a bunch of the grass, so that all four bunches lay in a row along the line of march. This done, the leader returns to his place and the warriors march out, each group in single file, over the four bunches of grass. When a man of the *Hóⁿga* division arrives at the four bunches of grass, he does not forget to put forward his right foot to step upon the first bunch of grass when taking his four sacred footsteps in marching out, and a man of the *Tsízhu* will remember to put forward his left foot first as he takes his four sacred footsteps.

The teaching of the symbol, expressed in the ceremonial arrangement of the tribe, as that of a man and his going forth, as acted out in the war ceremonies, became so fixed in the minds of those who had been initiated into these rites that they repeated the acts of the "going forth" of the symbolic man when they were about to enter upon the duties of their daily life, as when a man of the *Hóⁿga* side, on arising in the morning, always puts on his right moccasin first, and a man of the *Tsízhu* side puts on the left moccasin first, so that his steps might follow those taken by the symbolic leader.

When the men who planned the organization subdivided each of the two great divisions into smaller groups, they declared two of them to be peace-makers, one for the *Hóⁿga* and one for the *Tsízhu*. The one for the *Hóⁿga* was called *Póⁿka Washtage*, the Gentle *Póⁿka*, and the one for the *Tsízhu* was called *Tsízhu Washtage*, the Gentle *Tsízhu*. From the minds of the people of these two gentes were removed all thoughts of vengeance, bloodshed, and acts of violence.

From among the people of these two groups were chosen two chiefs, one from each group. It was the duty of these two chiefs to maintain peace within the tribe and to sentence to exile any member of the tribe who became unruly and defy authority. It was also their duty to conduct the buffalo hunt, during which one chief issued the orders for the march one day and the other chief those for the next day, and so on through the entire journey, thus making it appear as though the tribe was moving on two legs. The position of each of the two chiefs was hereditary. If a murderer fleeing from vengeance

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should happen to run into the house of a member of one of these two groups, he would be given protection by all.

When a war-party returned, bringing home a captive, all the members of the tribe who had been initiated into the mysteries of the tribal rites assembled to decide the fate of the captive. The two chiefs were also called to the council. If the warriors, ignoring the presence of the peace-makers, decided to take the life of the captive, these did not interfere; but if the captive were referred to either one of the chiefs, he would say, "Since you have referred the captive to me, I can only say, let him live." No one could then offer harm to the stranger, for to take his life would be murder, and the murderer would have been punished. When the chief thus passed his word, the ceremony of adopting the captive into the tribe proceeded. A member of the Black Bear gens was called on to draw a little of the captive's blood, a symbolic elimination of his natural relation to the tribe in which he was born. Then a member of the Water gens was summoned to give him water to drink, symbolizing the life of the Osage. Corn was also given him to eat, by a member of the Buffalo gens, which also symbolized Osage life. The captive's face was then painted with yellow clay furnished by the Elk gens, after which two narrow black lines, close together, were drawn upon his face, beginning at one corner of his forehead and ending at a point under the ear on the opposite side. The drawing of the two lines on his face meant that from that time he was the official messenger of the two great divisions at the performance of the ceremonies of the tribal war rites, and that he should be accorded the respect due to his position. If his captor were a *Hónga*, the two lines commenced at the left corner of his forehead and ended below his ear on the right side. If the captor were a *Tsízhu*, then the two lines began at the right corner of the captive's forehead and ended below his ear on the opposite side of the face.

The decree of the chief that the captive should live, and the performance of the adoption ceremony, not only made him a member of the tribe but of the gens to which his captor belonged, with all the rights and privileges to which a native Osage was entitled; and he became a member of the family of his captor, who treated him as his own son. This addition to the tribal family was purely by ceremonial acts; nevertheless, it was regarded as sacred, as an addition by natural birth, and did not affect the unity that was vital to the tribal organization.

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Cardan's Suspension in China

By BERTHOLD LAUFER



HE mechanical contrivance commonly styled "gimbal"¹ is known in the history of science under the term "Cardan's suspension". Although named for the celebrated Italian mathematician Jerome Cardan (Girolamo Cardano, or Latinized Hieronymus Cardanus; 1501-76), both the principle and its application were revealed and practised ages before his day. In fact, Cardan himself lays no claim to originality in this invention, but in his work *De subtilitate rerum*, first published in 1551, he merely describes a chair constructed for an emperor, which permitted him to sit in it during a drive without experiencing the least jolting, and on this occasion observes that the same arrangement had been used previously in connection with oil lamps.²

As intimated by Berthelot, Cardan must have encountered the invention bearing his name in the writings on the secret processes of magic, to which he was not foreign. Not only was he a philosopher, a physician, and a devotee of science, but also an astrologer, charlatan, and gambler.³ We now even possess a clew to this magical document presupposed by Berthelot, as will be seen farther on.

The nearest predecessor of Cardano was Leonardo da Vinci (1452-1519), who left a design showing the suspension of a body, said to be capable of turning itself around three axes perpendicular one to another.⁴ This construction, however, is not due to Da Vinci's genius either, for, as first shown by M. Berthelot,⁵ the great French historian of chemistry, it was well known during the early middle ages. The document on which Berthelot's opinion is founded is contained in a curious Latin manuscript, the *Mappæ clavicula* (that is, "Key

¹ Derived from Old French *gemel*, which is based on Latin *gemellus*, diminutive of *geminus* ("double", "twin"). The New Oxford English Dictionary gives the following definition of the term: "A contrivance by means of which articles for use at sea (esp. the compass and the chronometer) are suspended so as to keep a horizontal position. It usually consists of a pair of rings moving on pivots in such a way as to have a free motion in two directions at right angles, so as to counteract the motion of a vessel."

² Compare F. Cajori, *A History of Physics*, p. 24, New York, 1899.

³ As is also well known, the solution of the cubic equation known as Cardan's method is not due to his merit, but was the discovery of his countryman Tartaglia, who communicated it to Cardan in 1541, whereupon the latter published the solution under his own name.

⁴ E. Gerland, *Geschichte der Physik*, p. 250.

⁵ First in *Comptes-rendus de l'Académie des Sciences*, vol. CXI, 1890, p. 940; then in *La Chimie au moyen âge*, vol. I, pp. 176, 177, Paris, 1893.



CHINESE BRASS BRAZIER IN CARDAN'S SUSPENSION. DIAMETER 18.7 CM.
(Field Museum of Natural History, Chicago, cat. no. 117679)

LAUFER—CARDAN'S SUSPENSION

to Painting”), treating in the main of recipes giving substitutes for gold and silver, recipes for writing in gold and silver, purple dyeing and technique of pigments. The work is of especial importance for the first indubitable mention of alcohol. It is extant in an English manuscript of the twelfth century edited by Sir Thomas Phillipps in *Archæologia*,¹ and in a German manuscript of the tenth century in Schlettstadt, found by A. Giry in 1877. H. Diels² dates the compilation of the Latin work in the time of Charles the Great, on the basis of linguistic arguments, and, like Berthelot, traces its contents to the Alexandrian school of alchemists. The text of the mediæval book in many cases agrees exactly, even in particulars, with the sources of Greek alchemy; and if more of these had been preserved to us, the coincidences would presumably be still more numerous. This point of view should be emphasized, as the ideas emanating from the *Mappe clavicula* point straight to Alexandria. The passage relative to a suspension à la Cardan is embedded in a series of recipes for magicians or jugglers, and runs as follows: “Given four concentric circles revolving the one about another, so arranged that their diameters coincide; if a vase is suspended in their interior, in whatever way they may be turned, nothing will be spilled.” Berthelot thought it probable that this idea would be traceable to Greek physicists, but at that time could not prove his supposition. In this estimate, however, he was not mistaken, for about a decade later the fact was established in the writings of Philo of Byzantium, a Greek mechanician who in all probability lived in Alexandria during the third century B.C.³ His work on mechanics (*μηχανικὴ σύνταξις*) is lost, except the fourth book dealing with military engines (the oldest extant work on artillery) and excerpts from the seventh and eighth books. The fifth book on pneumatics is preserved in the Latin translation of an Arabic manuscript and in an Arabic recension. The latter has been edited and translated by Baron Carra de Vaux. Here we read in article 56 as follows: “Construction of the octagonal inkwell, a very elegant apparatus. We make an inkwell octagonal, hexagonal, square, pentagonal, or whatever form may be given to prismatic glasses. This inkwell has on each side a place whence ink may be drawn, and in whatever position this object is placed, its upper face presents you an opening for the introduction of the pen without anything being overturned. The pen is dipped in, it meets the ink, and you write

¹ Vol. xxxii, 1847, p. 187.

² Die Entdeckung des Alkohols, *Abhandlungen Preuss. Akad.*, 1913, pp. 6–17.

³ W. Schmidt, *Heronis Alexandrini opera*, vol. 1, p. lxx; F. Susemihl, *Gesch. d. griech. Lit. in der Alexandrinerzeit*, vol. 1, p. 744. Others assign his lifetime to the second century B.C. The problem is still controversial.

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with it. For instance, compare this hexagonal inkwell as you see (fig. 1). In the interior is a collar on a pivot $\alpha\beta$; in this collar is another on a pivot $\gamma\delta$; in this interior of the second chain is a cup on a pivot $\epsilon\zeta$, and this cup forms the inkwell. One might say this is the Jewish style and the construction of the apparatus resembles that of the censer which turns while remaining at equilibrium. Measure this construction well and adjust it carefully, so that every time you place the inkwell on any face, that which is presented for the entrance of the pen is the top of the inkwell." The manuscript of Oxford adds to the figure the following comment which must be a subsequent interpolation: "This movable apparatus is like the throne of Solomon, the son of David. When somebody familiar with Solomon's throne makes use of it and ascends it, he will remain there; a person unfamiliar with

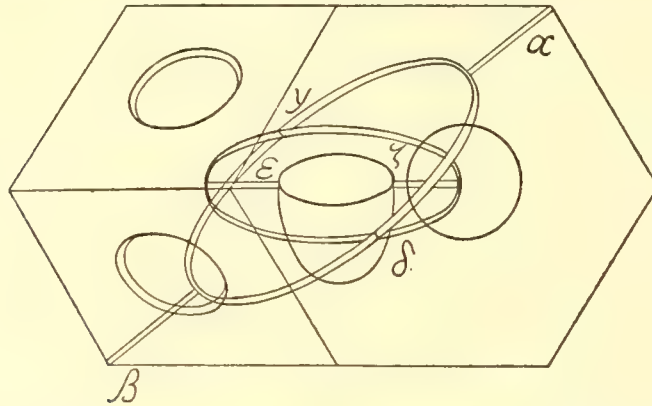


FIG. 1.—Philo's Inkwell in Cardan's Suspension (after Baron Carra de Vaux).

it, who will sit down in it, will fall to the ground. This is very nice."¹ Here we have a magical source like the one from which Cardan may have derived his description of the suspended imperial chair. In his introduction (p. 36) Carra de Vaux discusses the question of possible interpolations in the Arabic version and makes this observation on our passage: "The most curious article is that of the suspended inkwell which is found both in the manuscript of St Sophia in Constantinople and in the anonymous collection of Oxford. This inkwell is based on a suspension à la Cardan. It is somewhat astounding that

¹ Baron Carra de Vaux, *Le livre des appareils pneumatiques et des machines hydrauliques par Philon de Byzance* (tiré des *Notices et Extraits des manuscrits de la Bibl. Nat.*, vol. xxxviii, Paris, 1902, p. 195).

LAUFER—CARDAN'S SUSPENSION

this ingenious arrangement has been forgotten by Hero and the subsequent mechanicians; but it is not impossible, after all, that it should have been forgotten. The text says that this mode of suspension was utilized in the Jewish censers; some archeologist versed in Hebrew antiquities might possibly deduce a date therefrom." There can be no doubt that the description of the inkwell was part and parcel of Philo's original Greek text, and that the Arabic translation renders a correct account of it.¹ This is confirmed by the *Mappæ clavicula*, and we are fully entitled to the conclusion that the principle of Cardan's suspension was well familiar to the great Hellenic mechanicians of the Alexandrian epoch.

Whether the allusion to the Jewish censer hints at some Semitic influence can hardly be decided in the present state of our knowledge. What is of particular interest in this connection is the fact that in China also the Cardanic principle has been applied to censers or braziers.² Berthelot already had some vague information to the effect that "suspension à la Cardan has been employed in eastern Asia probably from times immemorial, as the Chinese do not change their processes." This point, however, he added, would require further elucidation.

The principle is well exemplified in a Chinese brazier obtained by the writer in 1909 at Si-ngan, the capital of Shen-si Province, for the Field Museum, Chicago (cat. no. 117679). In its outward appearance it presents a hollow sphere of brass, cut out into rosette-like designs in open-work, and composed of two hemispheres (see pl. I, upper figure), one fitting above the other. If the upper one is removed (lower figure on the same plate), we notice in the interior a round brass bowl, which may be filled with aromatic substances, incense, or burning charcoal. If filled with coal, the brazier conveniently serves as a bed-warmer, as the sphere may be rolled and knocked around *ad libitum*, while the bowl swinging freely and independent of this motion will never turn upside down. The contrivance consists of two brass hoops, so arranged that one is within and perpendicular to the other. The outer hoop is riveted to two lugs, projecting from the inner side of the hemisphere and made in the same cast with it. The inner hoop moves on a pivot connecting it with the outer hoop and encircles the brass bowl. The bowl, accordingly, remains constantly suspended in a vertical position, while the rolling motion of the sphere is not com-

¹ This, so far as I know, is the generally accepted opinion. See, for instance, J. L. Heiberg, *Naturwissenschaften und Mathematik im klassischen Altertum*, p. 59.

² We still apply it to ship's lamps, the mariner's compass, and to barometers. A barometer suspended à la Cardan is figured and described by E. Atkinson, *Elementary Treatise on Physics*, 13th ed., p. 145, New York, 1890.

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municated to it. The whole construction is very similar to the Alexandrian inkwell.

The brazier in question was attributed to the Ming period (1368–1643) by my Chinese informants of Si-ngan, and this date seems plausible. At present, this contrivance is no longer in use, at least not in northern China. According to Chinese tradition it is due to Ting Huan, a famed mechanician of the Han period (206 B.C.–A.D. 220),¹ who excelled in the making of ingenious mechanical devices, and who lived in the capital Ch'ang-ngan (now Si-ngan). He is credited with the invention of censers or braziers styled “reclining on the mattress” or “brazier in the bed-clothes”, by the application of four revolving rings, so that the body of the vessel was kept at equilibrium, and could safely be placed on the bedding. This tradition doubtless refers to an instrument like the one described and figured. Its origin in the Han period is perfectly credible, as this was the era when mechanics and engineering awoke in China, and a scientific knowledge of nature gradually began to dawn. This also was the epoch when China was opened to intercourse with the West, and when along the trade-routes leading across Central Asia into the Roman Orient Hellenistic ideas and inventions were conveyed to the Chinese. Hellenism, the first universal civilization in the history of the world, based on a syncretism of Greek, Egyptian, and Semitic concepts, expanded into all directions of the globe, and Alexandria was its spiritual center. A single case certainly lacks convincing force, but the totality of coinciding phenomena with which we are now confronted is so overwhelming that Hellenistic influence on ancient China can no longer be denied. It is most obvious in the natural sciences, particularly alchemy and mineralogy, and in technology. All that is recorded of mechanical innovations in the Han period is traceable to the writings and models of the Alexandrian mechanicians. The application of Cardan's suspension is only one example, but perhaps not the least interesting.

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¹ The exact date of his lifetime is not known; more probably he lived at the time of the Later or Eastern Han dynasty (A.D. 25–220), rather than under the Former or Western Han (206 B.C.–A.D. 24). The activity of this artisan is discussed in the writer's *Chinese Pottery of the Han Dynasty* (pp. 196–198), where also the relevant Chinese text is cited.

Historical and Sociological Interpretations of Kinship Terminologies

By ROBERT H. LOWIE



TUDENTS of kinship terminology have been interested almost exclusively in the *sociological* inferences that may be derived from systems of relationship. They have generally failed to note that Morgan himself drew not merely sociological, but also startling *historical* conclusions from the observed phenomena. Indeed, in this regard Morgan may fairly be said to out-Graebner Graebner. He not only rejects the hypothesis that similarities in relationship nomenclature can be explained by independent development, but also summarily dismisses the suggestion of diffusion by borrowing: nothing will do but racial affiliation.

In other words the Turanian and Ganowanian families drew their common system of consanguinity and affinity from the same parent nation or stock from whom both were derived, etc. . . . When the discoverers of the New World bestowed upon its inhabitants the name of *Indians*, under the impression that they had reached the Indies, they little suspected that children of the same original family, although upon a different continent, stood before them. By a singular coincidence error was truth.¹

This extravagant view was quite correctly criticized by Lubbock when he pointed out that the Two-Mountain Iroquois can hardly be recognized as more closely akin to remote Oceanian tribes than to their fellow-Iroquois. But while this criticism (with an indefinite number of similar instances that lie at hand) eliminates the use of kinship terminologies for ascertaining *racial* affinity, it does not dispose of them as evidence of *cultural* connection. Indeed, Morgan himself repeatedly cites resemblances that become intelligible only from this point of view; yet with that characteristic lack of the logical sense that detracts so largely from his otherwise superb pioneer achievements he fails to see the bearing of his data. Professor Kroeber—the only writer since Morgan who has departed fundamentally from the sociological point of view—assumes an historical position when he points out that differences in terminology are regional; but so far as I can see, he does not stress the obvious con-

¹ Systems of Consanguinity and Affinity, p. 508.

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clusion that the similarities within a given region are due to historical connection.¹

In the following pages I will cite a number of striking similarities that are explicable as the result of historical connection and will discuss the relation of these facts to a sociological interpretation.

While the differentiation of elder and younger brothers and sisters is of very common occurrence, a tripartite classification of *Geschwister* is not found, so far as I know, except among the Eskimo. The Alaskan Eskimo, according to notes supplied by Dr E. W. Hawkes, have distinct terms for elder brother, younger brother, and youngest brother. Corresponding to this, we find among the Chukchee three distinct terms for eldest brother, middle brother, and youngest brother; and a similar nomenclature among the Koryak.² The peculiarly restricted distribution of the phenomenon is such as at once to suggest diffusion. Here, however, an alternative explanation may be given. Though diffusion be the ultimate cause, the immediate antecedent of the similarity may be similar social conditions. In other words, it is certain social peculiarities relating to the status of eldest and youngest brothers that may have been borrowed and the kinship terms may have developed independently from these borrowed usages.

A like perplexity confronts us when we consider the systems found east of the Mississippi and some of the adjoining Plains territory to the west. It is true that a characteristic trait of these systems—the merging of collateral and lineal kin—occurs in a continuous, though vast, area so that its distribution would, according to accepted criteria, be explained by dissemination from a single source. However, it is also true that this area is practically coextensive with the Eastern area of clan exogamy. The hypothesis is, therefore, *a priori* tenable that clan exogamy was the feature diffused, from which a corresponding kinship nomenclature developed independently in a number of cases. We must eliminate such possibilities if we are to establish the historical significance of kinship terms themselves.

Among the numerous tribes in the eastern and central United States which designate collateral kin by the terms used for lineal relatives there are nevertheless certain far-reaching differences connected with the tendency to recognize or to ignore differences of generation. Mr Leslie Spier's as yet unpublished researches in this field indicate that this tendency appears primarily in the designation of cross-cousins. This phenomenon had not escaped the attention of

¹ Classificatory Systems of Relationship, *Jour. Royal Anthr. Inst.*, xxxix, 1909, p. 81.

² M. A. Czaplicka, *Aboriginal Siberia*, Oxford, 1914, pp. 30, 35.

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Morgan.¹ As he points out, the Seneca, Ojibwa, and Dakota designate a mother's brother's and a father's sister's child as "cousin"; the Southern Siouans (and Winnebago) call the mother's brother's son "uncle" and the father's sister's son "nephew"; the Crow and Hidatsa class the former with the son and the latter with the father: and at least part of the Crow-Hidatsa scheme occurs among the Choctaw and related tribes.²

I have elsewhere shown that the striking difference between the Southern Siouans and their northern congeners, the Crow and Hidatsa, is a function of the difference in rules of descent.³ Owing to the very close linguistic affiliation of the Crow and Hidatsa, most ethnologists will agree that their kinship systems (which coincide in many points besides those cited) were neither borrowed from each other in recent times nor arose independently, but are survivals from the system of the parent tribe, which pristine system, then, expressed the maternal (clan) organization. For like reasons, a corresponding conclusion will be deemed permissible for the Omaha and their immediate relatives, whose pristine system, as already noted by Kohler and Cunow, reflected their paternal (gentile) organization.

But as the example of the matrilineal Seneca and the patrilineal Ojibwa indicates, the rule of descent *need* not be reflected in the kinship nomenclature; for here we have tribes of different rules of descent with the same mode of designating cross-cousins, who are *not* placed in a generation above or below that of the speaker. I will not now attack the more general problem why certain tribes emphasize rules of descent while others do not. I prefer to render the problem more specific, and therefore more amenable to solution by confining attention to a single linguistic stock and to a single branch of that stock, among whose members there is a cultural bond as well. Of the Central Algonquians, the Miami, Sauk and Fox, Kickapoo, Menomini, and Shawnee agree among themselves and differ from the Ojibwa in classing the mother's brother's son and father's sister's son with the uncle and nephew, respectively; the corresponding female cousins with the mother and daughter, respectively.⁴ But this is precisely like the system of the Winnebago and Southern Siouans, as Morgan himself expressly states! Why do the Algonquian terminologies cited resemble those of a group of Siouan tribes rather than the Ojibwa nomenclature?

In order to appreciate the significance of the actual facts, we must

¹ Op. cit., p. 189.

² For the sake of simplicity I cite only some of the relevant data.

³ *American Anthropologist*, 1915, p. 237 f.

⁴ Morgan, op. cit., pp. 211-217. My attention was drawn to these facts by Mr Leslie Spier.

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plot them on some such map as that of Mooney in his paper on The Cheyenne Indians.¹ We then find that the system in question is spread over an absolutely continuous area, covering the territory of the Menomini, Winnebago, Iowa, Omaha, Ponca, Oto, Kansas, Osage, Illinois, Sauk and Fox, Miami, and Shawnee. But the Ojibwa also form part of a fairly continuous area,—that including besides their own habitat that of the Cree, Dakota, Wyandot, and Iroquois, all of whom designate cross-cousins as cousins. Since within both areas members of distinct linguistic families share the same kinship features, the similarities, unless explicable by similar social conditions, can be explained only by diffusion.

The similarities cannot be explained by similar social conditions. The Ojibwa do not possess either the clan or the moiety system of the Iroquois, yet they have a similar nomenclature. They do possess the gentile organization of the Central Algonquian, yet that similarity was not an adequate cause for the production or maintenance of a system similar to that of the Central Algonquians. No sociological condition can be conceived that might account for the empirical distribution of traits. On the other hand that distribution corresponds so closely to the criterion ordinarily demanded for a proof of diffusion that diffusion, and diffusion only, must be accepted as the explanatory principle.

For the present discussion the distribution of systems with a clear development of reciprocal terms is important. To choose a common example, grandparent and grandchild are designated in these systems by a common term, or at least by a common root to which a diminutive affix is attached to distinguish the junior relative. So far as I know, systems in which reciprocal terms figure at all conspicuously are completely lacking in the Eastern Woodland, Southeastern, and Plains areas. On the other hand, they have been recorded among the Lillooet, Squawmish, Okinagan, Spokane, and Nez Percé;² the Wishram, Takelma, Uintah Ute, and Kaibab Paiute;³ the San Carlos Apache;⁴ the Navaho;⁵ the Zuñi;⁶ the Tewa, Acoma and Cochiti;⁷

¹ *Memoirs Amer. Anthr. Assoc.*, vol. I, pt. 6, 1907.

² For the first three, only so far as great-grandparent and great-grandchild are concerned. Boas in *Report of the Sixtieth Meeting of the British Association for the Advancement of Science*, 1890, pp. 688-692. Morgan, *op. cit.*, pp. 245, 249.

³ Sapir in *American Anthropologist*, 1913, pp. 132-138.

⁴ Oral communication by Dr Goddard.

⁵ Franciscan Fathers, *An Ethnologic Dictionary of the Navaho Language*, pp. 435-436. Personal communication by Dr Elsie Clews Parsons.

⁶ Communication by Dr Kroeber.

⁷ Communications by Drs Parsons and Radin; Harrington in *American Anthropologist*, 1912, pp. 472-498.

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the Papago;¹ the Yokuts;² the Kern River and Mono;³ the Paviotso, Moapa and Shivwits Paiute, Wind River and Lemhi Shoshone;⁴ and the Kootenay.⁵ Having regard to our very meager information on some of the tribes concerned, every one must again be impressed with the fact that the trait discussed is spread over a large, practically continuous area, among more than half a dozen distinct linguistic families, while outside that area it is lacking.

This phenomenon of distribution cannot be explained sociologically. The tribes cited vary fundamentally in social organization and usage. Nothing could be more distinct in this regard than the clan division of the Pueblo tribes and the loose organization of the Plateau Shoshoneans. Moreover, no social usage that could conceivably unite grandparent and grandchild has ever been reported in North America, no trace of anything like the Australian class system being known.

A more minute examination supports the theory of diffusion. Sapir has shown that "in this matter of relationship terms two such closely related dialects as Ute and Southern Paiute differ on a point on which they respectively agree with a neighboring Shoshonean and with a non-Shoshonean language (Tewa). Here, as often, a cultural dividing line runs clear across a homogeneous linguistic group."⁶ Similarly, Mr Gifford informs me that the Kern River people share with the Southern Paiute the use of diminutive suffixes for the junior relative designated by a reciprocal term. These tribes, though belonging to distinct branches of the Shoshonean family, are geographically contiguous. Why they should agree in a feature not common to the entire family is not at all clear unless we assume that the similarity is a contact phenomenon. Here again a sociological interpretation is barred at the outset: what social usage or institution *could* lead to the employment of a diminutive suffix?

I can refer only briefly to certain other points. The occurrence of the distinction between vocative and non-vocative forms is one of the phenomena that should be investigated and plotted on a map. It is markedly developed among Siouan tribes, but has also been noted by Uhlenbeck for the Blackfoot,⁷ by Morgan for the Nez Percé and Yakima,⁸ by Sapir for the Wishram. Before adopting any interpretation we must determine more definitely the distribution of this trait.

¹ Dr Kroeber.

² Kroeber, *The Yokuts Language*, p. 240.

³ Mr Gifford.

⁴ The writer's field notes.

⁵ Professor Boas.

⁶ Sapir, *loc. cit.*

⁷ *Internationales Archiv für Ethnographie*, xx, 1912, p. 205.

⁸ Morgan, *op. cit.*, pp. 249 f.

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Another very interesting feature is the differentiation of maternal and paternal grandparents. This is so completely lacking in the immense area east of the Rocky mountains that Morgan has not even distinct tables for these relationships and notes their discrimination with some surprise for the Spokane.¹ Yet in the Far West of the United States it is exceedingly common. Boas notes it for the Kalispelm and Okinagan,² it occurs probably among the majority of Plateau Shoshoneans,³ among the Takelma and Wishram,⁴ and according to Professor Kroeber is widespread in California. According to Harrington and Kroeber, it exists also among the Tewa and Zuñi; weakly developed, it occurs among the Navaho. It is a striking fact that in the North American areas in which clans, gentes, and moieties occur (including the Tlingit and Haida) and where accordingly a discrimination between maternal and paternal grandparents might *a priori* be expected, such a distinction exists only in the Southwest, while the discrimination occurs precisely in the region without definite social organization. We are clearly dealing with an historical problem.

Still another peculiarity may be mentioned here because its occurrence seems restricted to the same general area—the change of terms after the death of a near or connecting relative. This has been found by Professor Kroeber among the Yokuts and by Mr Gifford among the neighboring Kern River and Kawaiisu Shoshoneans of California; Boas recorded it for several Salish tribes, the Chinook, and the Kootenay.⁵ Again one cannot think of a social custom prevalent among these tribes capable of producing the terminological feature and lacking among tribes without it.

Finally, I may refer to the absence of separate terms for elder and younger brothers and sisters. The failure to distinguish these differences within one's own generation marks the Pawnee system,⁶ and occurs in that of the Kiowa.⁷ The fact that so glaring an anomaly from the point of view of the ordinary North American system should occur in the same portion of the Plains area is hardly without significance; and, once more, we are tempted to ask what social usage can be lacking here that unites the rest of the North American tribes.

The foregoing remarks seem to me to establish the principle that features of kinship terminology are distributed like other ethnographical phenomena and must be approached in the same spirit. Like

¹ Morgan, *ibid.*, p. 247.

² Boas, *loc. cit.*

³ Sapir, *loc. cit.*, and the writer's field notes.

⁴ Sapir, *loc. cit.*

⁵ Boas, *loc. cit.*; *American Anthropologist*, 1904, p. 135; and manuscript notes.

⁶ Morgan, *op. cit.*, p. 197.

⁷ Writer's field notes.

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specific customs, beliefs, or implements, particular features of kinship nomenclature are sign-posts of cultural relationship. This being so, it becomes obvious that in order to get the full benefit of relationship systems for historical purposes it does not suffice to record the fundamental elements of a terminology. On the contrary, as in other cases apparently trifling features are the most important because when they are found to occur in distinct tribes a *specific* historical connection is indicated. It is likewise clear that after such a general qualitative orientation as I have given above, far more detailed and in some measure quantitative studies along lines suggested by Professor Kroeber must set in. It is not the same thing whether half the terminology of a tribe is reciprocal or whether reciprocity is expressed only for the paternal grandfather and the son's son; nor whether classificatory terms (in an etymological sense) exist like our own "cousin" and "uncle" or whether the classification includes father's brothers with the father, as in many primitive systems. A much finer statistical treatment is likely to reveal the accentuation of traits in a particular center of distribution and their gradual diminution as we pass toward the periphery of the area in question. If, as appears rather likely from certain indications, the entire western slope of the United States should then be found to differ markedly from the rest of the continent in point of kinship terminology, that result would be of considerable historical significance, over and above the value of particular historical inferences.

It remains to say a word on the relation of the historical to the sociological point of view. In a paper already cited I have expressed my belief in the validity of sociological interpretation, and since I still adhere to this conviction I feel it incumbent to harmonize with it the apparently contradictory argument of the preceding pages.

As stated above, I am in favor of dealing with kinship terms in the same way as with other ethnographic features. In the interpretation of cultural resemblances the criterion for historical connection generally applied by American investigators is occurrence in a continuous area or among tribes of known historical relations, while in other instances they assume independent development. This procedure does not solve all perplexities but seems the only one that can yield any assistance at all, and it is applicable in exactly the same way to the problems at hand. When I find a reciprocal system among the Yokuts and Kern River Indians, I explain the similarity by diffusion; when I find a reciprocal system among the Australian Arunta and the Kern River Indians, I do not. In this latter case the question naturally arises *how* the similarity could arise independently. If the

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Californians possessed a class system like that of the Arunta, I should not hesitate to ascribe the similarity to this institution; since neither they nor any other American tribes have anything of the sort, I confess that I have no explanation to offer. But we are not always so unfortunate. The fact that the Tlingit and Crow class the father's sister's daughter with the father's sister *is* intelligible from the common possession of a maternal exogamous grouping by these tribes. Here as among the Choctaw, certain Pueblo and some Melanesian tribes the clan factor has proved stronger as a classificatory device than the generation factor. Obviously clan exogamy does not furnish a complete explanation, since it does not produce the same effect among the Iroquois, to cite but one illustration. Whether we can adduce an additional sociological determinant, remains to be seen. At all events, we may say that the trait in question is a function of matrilineal descent *plus* certain unknown factors tending to an accentuation of the rule of descent. So, wherever we can connect empirical resemblances between unrelated tribes with actual social customs from which those resemblances naturally flow, we have an adequate explanation of the phenomenon of similarity and do not require recourse to borrowing or cultural relationship.

As everywhere, so here there will be room for doubt and subjective interpretation. For example, who would state categorically that the clan system of the Muskogean did or did not give rise to the merging of collateral and lineal kin independently of the development of this feature among the other tribes of the Eastern clan area? Here we find both similar conditions adequate to the production of the terminological trait *and* contiguity of territory. I can conceive the diffusion of a clan organization *with* a correlated terminology at a relatively early period over the entire Eastern area; but I can also conceive an independent development of the terminology from a mere diffusion of the clan concept (not to consider other logical possibilities). If the Tlingit and Haida developed a "classificatory" system independently, so could the Choctaw or the Iroquois. In such instances I think it best to admit frankly either that we can not make up our minds or that our theoretical preferences rest on more or less subjective grounds. In this regard the study of kinship nomenclature does not differ in the least from like investigations of other cultural elements. And I hope the foregoing remarks have illustrated the axiom, sometimes ignored by ethnologists, that every ethnological problem is primarily a problem of distribution.

The Cult of the Ax

By GEORGE GRANT MACCURDY



COMPLETE genealogy of the ax would form an interesting chapter. Our modern ax (as well as hatchet) is a combination tool, being used both for cutting and as a hammer. This twofold character has been retained through long ages, so that the history of the ax proper is interwoven with that of the hammer or club, and the long phylogenetic history of both entitles them to rank high in the domain of archeology. The need of something with which to cut or sever, to bruise or break, is primal, whatever may have been the immediate purpose to be served. The prototype of the ax in the broad sense, then, was perhaps primitive man's first invention. With it he blazed his way to civilization. In time it came to be in a very real sense a part of himself, its origin as mysterious as his own. That to the ax should be attached unusual significance therefore is but natural, inevitable.

In the paleolithic prototypes of the ax there is little to suggest the existence of a cult,¹ unless it be on the one hand the diminutive, and on the other the exaggerated, size of certain specimens. During the neolithic and later periods however the evidence is unmistakable.

In the New World the cult of the ax is especially evident in the more or less elaborately carved effigy axes of semi-precious stone from Mexico and Central America, in stone statues represented as holding hafted axes, and in the monolithic axes from our own Southern States, the West Indies, and the West Coast.

The author's interest in monolithic axes has crystalized about a remarkable specimen (fig. 1), the history of which has been lost. Many years ago this ax was turned over to the Peabody Museum of Yale University by the Yale School of the Fine Arts. It had been broken into three pieces by its aboriginal owners; for two of the fragments retain the greenish color of the chloritized porphyry out of which the ax was carved, while the third has taken on a uniform reddish-brown tone due to fire or exposure. The three pieces fit together perfectly, and with the exception of a few slight chips the specimen is complete. Whether it had been "killed" or only accidentally broken will never be known. It is of a type now known to

¹ A. Rutot, *Sur les traces de l'existence d'un culte de la hache pendant le paléolithique inférieur*, *Congr. préh. de France, C. R., VI^e session, Tours, 1910*, Le Mans, 1911.

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have been found only in a restricted area of our Southern States; two other examples are known. One of these, now in the Museum of the American Indian, New York City, was found by Dr Joseph Jones

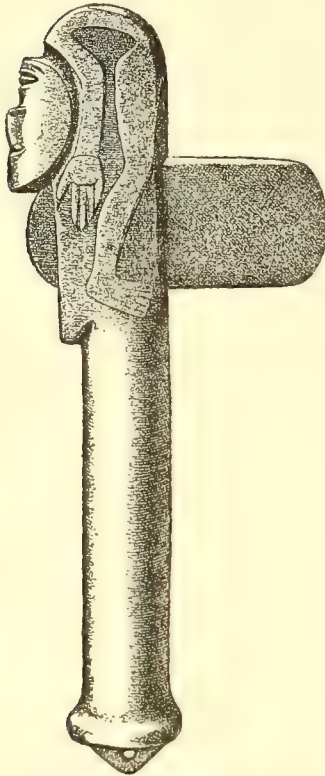


FIG. 1.—Monolithic ax of the type found in Tennessee and Alabama. $\frac{1}{3}$. (Yale University Museum, cat. no. 3701.)

under the skull of a male Indian (probably a chief) in a mound on the eastern bank of Cumberland river, opposite Nashville, Tennessee. The other was turned up by a plow near one of the larger mounds at Moundville, Alabama, and was secured by Mr Clarence B. Moore¹ for The Academy of Natural Sciences of Philadelphia. In all three specimens the grip of the helve or handle is cylindrical and provided with an annular swelling or pommel, beyond which there is a perforated protuberance. In all three the handle suddenly becomes larger and somewhat squarish in section before reaching the level of the hafting; this gives to the back of the handle a fairly well-developed stop or guard, which is more pronounced in the Yale specimen than in the other two. Another character in common is the flat poll of the ax. Moreover, the specimens agree notably in respect to size, weight, and the nature of the stone out of which they were carved. It is highly probable therefore that the specimen here figured came from a region whose northern and southern limits are roughly indicated by Nashville, Tennessee, and Moundville, Alabama. According to C. C. Jones² an "implement precisely similar in material and construction" to the one from near Nash-

ville was taken from a grave mound in York district, South Carolina.

The unique feature of the Yale ax is the well-executed, graceful, highly flexed figure in relief of an Indian, against whose back the haft-end of the handle seems to be thrust. The back of the Indian's head is in contact with the poll of the ax, and the feet extend almost to the level where the cylindrical portion of the handle begins.

¹ Certain Aboriginal Remains of the Black Warrior River, *Journ. Acad. Nat. Sci. Phila.*, XIII, 133-135, fig. 6, 1905.

² Antiquities of the Southern Indians, p. 281, New York, 1873.

MACCURDY—CULT OF THE AX

A curious bone pin, representing likewise a hafted ax, was recently discovered by Moore¹ in a mound near the Jones Place, Hempstead county, Arkansas, and is introduced here (fig. 2) because of its apparent kinship to monolithic axes from east of the Mississippi river and the West Indies. In the first place the stop or guard is precisely similar to that in the Yale specimen as well as in those from Nashville and Moundville respectively; secondly, the protuberances accompanying the projecting poll of the ax, which recall those on axes from the Bahamas; and, thirdly, the intermediate character of the poll, which is a cross between the pointed type of the West Indies and the flat type of our Southern States.

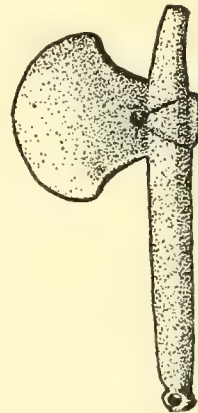


FIG. 2.—Bone pin with head in the shape of a hafted ax; from a mound near Jones Place, Hempstead county, Arkansas. $\frac{1}{2}$. (After Moore.)

The so-called "spud", or hoe-shaped implement, of the Southern States is another type of ceremonial ax. Examples reproduced by Moore² prove that the hafting was the same as in monolithic axes (the ax being set in the handle instead of the reverse), with often the additional feature of a thong passing through a small hole in the ax and wound around the handle. Mr Moore was so fortunate as to find at Moundville, Ala-

bama, a shell amulet in the form of a "spud" and handle in one piece, which demonstrates the exact method of hafting even to the presence of the thong (fig. 3). Like the splendid monolithic ax previously mentioned, also from Moundville, this miniature ax is provided with a perforation at the end of the handle.

FIG. 3.—Shell amulet representing a hafted hoe-shaped ceremonial ax; from Moundville, Alabama. $\frac{1}{4}$. (After Moore.)



Warren K. Moorehead³ reproduces from the Bennett H. Young collection a curious monolithic ceremonial ax found in northeastern Kentucky. The handle is plain, comparatively short, and does not project beyond the hafting. The poll is of the flat type. The unique feature is the development of the blade along its distal margin so as to produce a slightly recurved edge

¹ Some aboriginal sites on Red River, *Journ. Acad. Nat. Sci. Phila.*, XIV, 630, fig. 128, 1912.

² *Amer. Anthropologist*, N.S., V, 498, July-Sept. 1903.

³ The Stone Age in North America, I, fig. 287.

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more than five inches long, the total length of the specimen being but ten inches (25.5 cm.).

If these monolithic axes were ceremonial tomahawks, the use to which their prototypes were put on the arrival of the Europeans might throw some light on their own use. According to early writers the term tomahawk was applied by the English colonists to a variety of weapons, including the war-club, the celt-shaped ax, the grooved ax, etc. The Virginia Indians called the English metal hatchet "tomahawk"; but whether they or any other tribe applied this term "to the native stone celt-hatchet is not fully established" (Holmes).

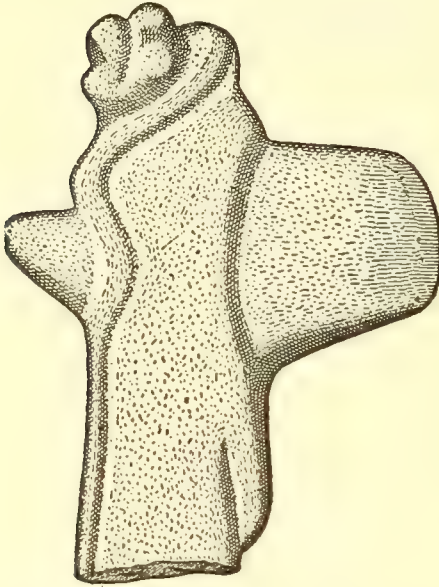


FIG. 4.—Monolithic ax with effigy handle representing an ape; probably from Santo Domingo. $\frac{1}{2}$. (Musée d'Artillerie, Paris. After Cartailhac.)

Other types of the monolithic ax are met in the West Indies. So far as the helve is concerned, there are two insular types, although with a single exception both agree in having a pointed poll. In one the helve is plain, in the other it is carved so as to suggest the form of an ape. A good example of the latter, found near Santo Tomás de Janico, Province of Santiago, Santo Domingo, was figured by Prof. E. T. Hamy, and later by Prof. M. H. Saville.

Prof. Emile Cartailhac¹ has also figured a monolithic ax representing the effigy of a monkey, similar in type to the one from Santo Tomás de Janico. He notes that it is entered in the catalogue

of the Musée d'Artillerie, Paris, as having been found in the Rhône, near Valence. But in his opinion its first provenience was not France; brought back from the West Indies as a curiosity, it had been lost and sooner or later thereafter found again. Cartailhac's illustration (fig. 4) shows distinctly that the pommel-end of the handle is missing, as referred to in his text. This same specimen is figured by Professor Hamy,² who does not use Cartailhac's illustration; nor

¹ *Les Ages préhistoriques de l'Espagne et du Portugal* (fig. 138), Paris, Ch. Reinwald, 1886.

² *Note sur des sceptres de pierre en forme de hache emmanchée, etc.*, *C.-R. Congr. intern. d'anthr. et d'arch. préhis.*, XIII^e session, Monaco, t. II, p. 157, fig. 128, 1908.

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does he state that the specimen had been published by the latter. He does refer to the broken end of the handle, although the break is not indicated in his illustration. Hamy does not mention the fact that the specimen had been found (for the second time) in the Rhône near Valence; he simply says that it is of the "same origin" as the one from Santo Tomás de Janico. Professor Hamy seems to have overlooked Cartailhac's previous reference to this specimen, as has also Professor Saville,¹ who bases his illustration on that of Hamy, and who even goes so far as to say that the specimen was "found near Santo Tomás de Janico, in the province of Santiago, Santo Domingo." That all three authors are dealing with one and the same object there can be no doubt. Saville states that this ax and the one that is known to have been found near Santo Tomás de Janico are the only examples of this type that have been found in the West Indies. On the other hand Cartailhac² deplores the curious coincidence of the finding, shortly prior to 1886 on the hills that dominate Toulouse to the south (collection of Mons. A. de Sevin), of another example, "sculptée de la même manière, pareille en un mot", and likewise incomplete.

Cartailhac also illustrates three other splendid examples of various types of the monolithic ax, all believed by him to have come without doubt from the West Indies and none of which is mentioned by Hamy or Saville. One of these (fig. 5), belonging to the Musée de Lyon, is not unlike the ape-like effigy ax shown in the preceding and belonging to a type known to have come from Santo Domingo. The specimen is complete. The workmanship on the head is of a superior order, and the arms are indicated in relief. In addition the pommel-end of the handle is carved to suggest an animal head with the eye distinctly outlined and closely resembling the handle of a monolithic ax from Santo Domingo figured by Saville

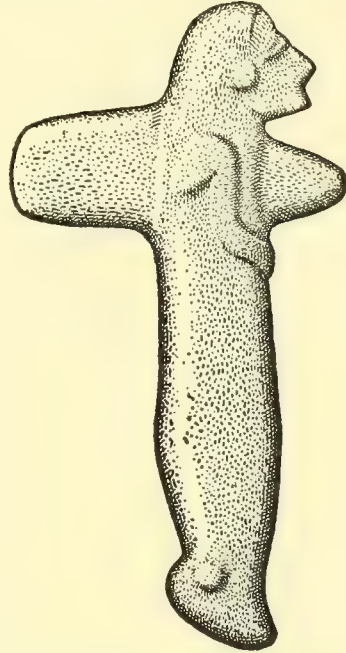


FIG. 5.—Monolithic ax with effigy handle representing an ape; probably from Santo Domingo. $\frac{1}{2}$. (Musée de Lyon. After Cartailhac.)

¹ Monolithic Axes and their Distribution in Ancient America, *Contributions from the Museum of the American Indian*, II, no. 6., pl. III, fig. 5.

² Op. cit.

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(see his pl. iv. no. 4). In both examples the effigy faces the poll of the ax, which is of the pointed type. The Lyons ax therefore evidently came from Santo Domingo; its length is 25.5 cm.

The second ax (fig. 6), now in the museum of the University at Coïmbra, Portugal, differs materially from any specimen reproduced by Saville. Here the haft-end of the handle (projecting beyond the hafting) represents the head of some creature, perhaps a bird, which contrary to the general rule faces toward the edge of the ax blade. The spheroidal pommel-end of the handle is provided with a biconical perforation, through which a cord passes. Contrary to the rule for monolithic axes from the West Indies, the butt-end of the ax is of the flat type. It is out of alignment with the blade proper, a feature noted by Saville in examples from Cuba as well as from Santo Domingo.

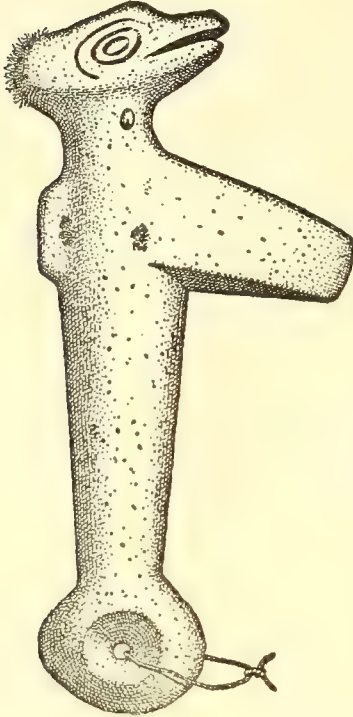


FIG. 6.—Monolithic ax from the West Indies. $\frac{1}{3}$. (Museum of Coïmbra, Portugal. After Cartailhac.)

The third example (fig. 7) is in the Museum of La Rochelle, France, and is a perfect example of the plain type of monolithic ax with pointed poll found in the Bahamas and Cuba.

Another center for the monolithic ax is in Oregon and northern California. The type is fairly constant and totally different from anything hitherto described. Three examples belonging to Peabody Museum of Yale University give a fairly good idea of the range of form (pl. i).

The first two were taken from an old Indian grave in 1874 by Samuel H. Snook, who was in the employ of the late Prof. O. C. Marsh. Snook wrote from Camp Watson, but does not specify where the grave was situated. The record simply says, "John Day River."

The third and largest specimen was found either in a "peculiar mound" 25 miles northwest of Cottonwood Station in a locality known as Pine Mountain, or in "a sort of grave filled with loose rocks in the Cove," which like the objects from the mound just mentioned "shows evidence of having been subjected to great heat."



MONOLITHIC EFFIGY AXES FROM OREGON
Yale University Museum, cat. nos. 3207-3209 (about 2500 B.C.)

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According to a letter¹ from Leander S. Davis, also employed by Professor Marsh to collect fossils, the mound was built of loose basaltic rocks, was "perhaps 20 feet in diameter at the base, 6 or 7 feet high, and conical in shape." There were a great many ashes "mixed all the way through the rocks," also fragments of bones and relics, although most of the remains were near the bottom of the mound. He says the mound had the appearance of being originally built on the top of the ground, but when seen by him was about half buried in the soil. It was in heavy pine timber and was discovered by Jesse Warfield while herding sheep.

All three specimens are of volcanic rock, the first being a fine-grained porphyry, and the other two probably a highly indurated volcanic ash or tuff.² The rather high fusibility of one of the latter is evidenced by its altered condition due to heat. The smaller two specimens were each broken in two pieces when found, and both show the effects of fire. In the case of the second specimen, one piece is much more altered by heat than the other, the change in color (to a reddish brown) being quite pronounced. Each specimen therefore might well have formed part of some sacrificial pyre.

All three axes are animal effigies, the last being so distorted by heat as to make impossible a profile view of the head and body at one and the same time. The last two are so nearly alike in this respect that a description of one almost fits the other. The fore and hind legs are represented by the two ax-blades. In order to emphasize the effigy idea, there is nothing to suggest the method of hafting; neither do the polls project beyond the back of the handle, which in this case is likewise the back of the

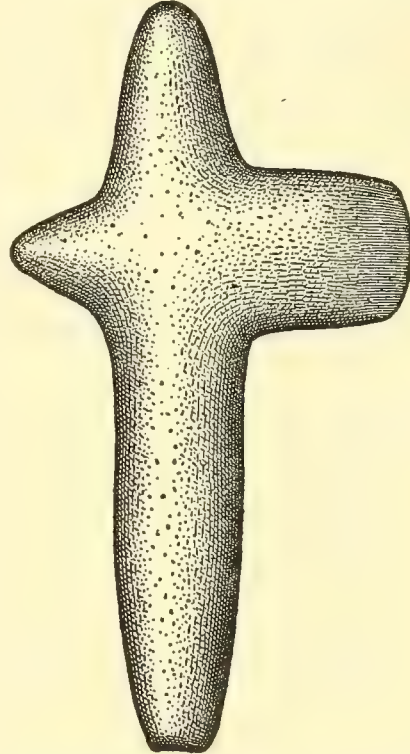


FIG. 7.—Monolithic ax from the West Indies. $\frac{1}{2}$. (Musée de La Rochelle. After Cartailhac.)

¹ From Canyon City, Grant county, Oregon, under date of July 23, 1880.

² Determinations by Prof. Joseph Barrell.

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animal. That the animal legs are intended to represent ax-blades as well, is indicated by the fact that each is sharpened to a well-defined edge. In both a longitudinal groove, apparently intended to heighten the zoömorphie effect by suggesting the parting of the hair along the dorsal ridge, reaches from the nose to half-way the length of the tail, which here serves likewise as the hand-grip for the ax. On each side of the longitudinal groove are short, parallel, incised lines at right angles to it; these lines being more pronounced on the nose than elsewhere. The ears are represented by slight protuberances.

In the first specimen with its single ax-blade, the zoömorphie character would be entirely lost sight of but for the dorsal longitudinal groove, a tiny artificial conical eye pit (hardly visible in the photograph), and a mouth groove.

Similar ceremonial, effigy, monolithic axes are reported from other parts of Oregon, and at least two counties in northern California. A fine example with two blades is (or at least was) in possession of Mr C. D. Voy of Oakland, California. It measures about 14 inches in length and is provided with the dorsal groove. Ears and eye are indicated, while the head and neck are ornamented by incised lines. It is said to have been found in 1877, "with numerous other stone relics and Indian remains, 6 feet below the surface in alluvial soil, near Saint Helen, Columbia river, Oregon." There is a cast of the Voy specimen in the United States National Museum (cat. no. 97612). The latter Museum also possesses the forward half, including one ax-blade, of an effigy monolithic ax (cat. no. 21464), said to be from the Wintoon Indians at Weaverville, Trinity county, California. In view of the distinct differentiation of the head, it is probable that the lost half carried with it an ax-blade representing the hind legs of the effigy.

In the shell-heaps of Humboldt bay, Humboldt county, which adjoins Trinity county on the west, Mr L. L. Loud of the Affiliated Colleges, San Francisco, has recently found three fine examples of the effigy monolithic ax exactly like those described above, even to the dorsal groove.

Curiously enough the United States National Museum possesses a carved antler from Ohio that resembles fairly closely in form this Oregon-California type of effigy monolithic ax. The nearest approach to the latter in stone is a monolithic ax (fig. 8) of the Tlingit Indians, Alaska.¹ The single ax-blade is an exact counterpart of the blades from Oregon and California. The handle however does not complete

¹ A. P. Niblack in *Report U.S. National Museum for 1888*, p. 283.

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a zoöomorphic unit, unless the knob and series of concentric circles at the haft-end can be considered as the head and eye. This specimen, and another similar to it, at one time belonged to Lieut. G. T. Emmons, U.S.N.

Saville reproduces two interesting monolithic axes from Nicaragua, one of which was obtained from a chief. In both the blade is represented as set in a sheath or socket, which in turn was set in the handle proper; the same effect would be produced if the original model was of antler and in one piece. This method of hafting does not of course require that the poll of the ax project through the handle; in fact it precludes such a possibility. The double-bladed monolithic axes (one blade opposite the other), also from Nicaragua, shown in plate VI of Saville's paper, might be looked on as a variety of (and development from) the Nicaraguan type just mentioned, rather than as a distinct type. In all events they were evidently derived from the same original. The changes in the handle, in the blades themselves, and the shortening of the sheath, would arise quite naturally from the necessity of providing for the additional opposite blade. Two of these double-bladed axes are said to have been obtained from a Mosquito chief in eastern Nicaragua.

An ax from Honduras (likewise figured by Saville), now in the Museum of the American Indian, is not unlike the original Nicaraguan type with single blade, except that the blade is indicated as set directly into the handle (through which it does not project), without the intermediary of a sheath. In the American Museum of Natural History are two small monolithic axes from a grave near Rio Don Diego, Province of Santa Marta, Colombia. In these, as well as in all the monolithic axes from the West Indies, Central America, and North America (i.e. from the New World entire), the blade is always represented as set in the handle, never the reverse; and the ax is always of the so-called celt-type, never the grooved type. This method of hafting, while probably the first one to be employed in the Old World, is not the only one to be found there; for before the close of the neolithic period in Europe, as well as after the beginning of the bronze age, the present method of setting the handle in the

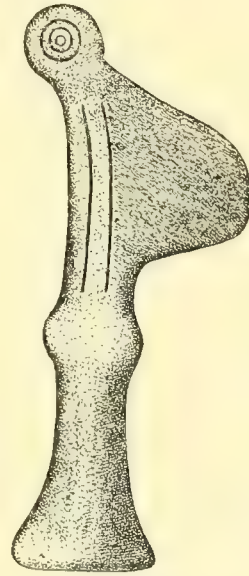


FIG. 8.—Monolithic ax;
Tlingit Indians, Alaska.
(After Niblack.)

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ax, which in turn was perforated for the purpose, was in vogue. It is an interesting fact that while the aborigines of the New World were more or less adept in the art of drilling stone and other materials, they have left practically no perforated axes proper.

In the Carnegie Museum of Pittsburgh there is a life-size stone statue in standing posture from Mercedes, Costa Rica, in whose uplifted right hand is an ax; in the left, a human head. The ax is represented as set in a handle through which the poll projects. The same idea is likewise expressed in a much smaller seated stone figure from Cartago, Costa Rica, also in the Carnegie Museum; for in the right

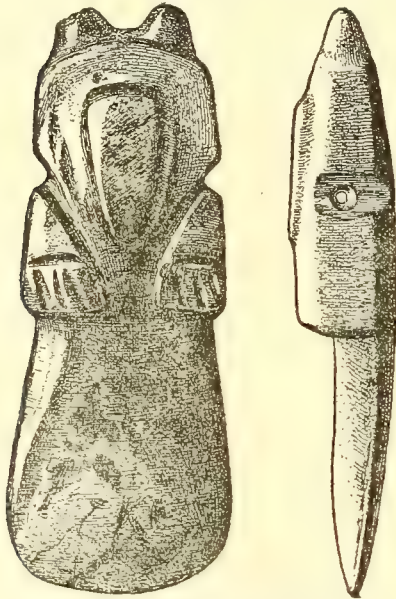


FIG. 9.—Ornithomorphic celt-shaped amulet of jade; Province of Chiriqui, Panama. $\frac{3}{4}$. (Yale University Museum.)

hand again is a hafted ax, and in the left a human head. The ax however is of a different type: double-bladed, one opposite the other, and both with serrated margins exactly like axes in the same museum (cat. no. 2439-3038) from the stone-cist graves of the ancient Güetares, Costa Rica. Another example of the double-bladed ax, probably of the same type, although the marginal serrations are not indicated, is held in the left hand and behind the back of a small stone statue, in whose right hand is a human head. This statue, found by Prof. C. V. Hartman at Orosi, near Cartago, is now in the Royal Ethnographical Museum at Stockholm. All three of these statues tell the same story of human sacrifice, either in war or as a rite. The same idea is no doubt expressed in the helmeted bronze figure

urine from Cupra Marittima, Picenum, Italy, holding in the right hand a sacrificial bowl and in the left a hafted ax. In a stone slab recently found at Petén, Guatemala, the figure of a man holds a hafted ax in his hand.

The celt-shaped effigy amulets often carved out of semi-precious stones, from Chiriqui (fig. 9), Costa Rica, and Mexico, afford additional evidence of the cult of the ax in ancient America. Large numbers of these from Las Guacas, Costa Rica, representing human, bird, and mixed attributes, have been reproduced by Professor Hartman.¹

¹ *Memoirs Carnegie Museum*, vol. III, no. 1, Pittsburgh, 1907.



LARGE EFFIGY JADE AX FROM MEXICO

Weight, 19 lbs. Troy. Kunz collection, American Museum of Natural History. (After Kunz, *The Curious Lore of Precious Stones*, Philadelphia, J. B. Lippincott Co.)

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One of the most remarkable examples of this class is in the George F. Kunz collection—a large jade ax from Mexico carved to represent a grotesque human form (pl. II).

Space forbids more than a mere summary of the evidences bearing on the cult of the ax in the Old World. In the valley of the Petit-Morin, near Courjeonnet and Coizard (Marne), are a number of artificial neolithic caves carved out of Cretaceous deposit. At least seven of these are decorated with sculptures in relief, representing (with a single exception) hafted axes and archaic human figures. For the greater part the sculptures are in antechambers to funeral caves.

One sculpture represents a female with nose, eyes, a necklace, and mammæ indicated. This relief is to the left of the vestibule. On each side of the door leading to the cave proper is the figure, in relief, of a hafted ax, in each case the blade being turned toward the entrance. Within the cave, also on each side of the door, are two other axes posed in like manner. One of these ax-blades is painted black, which sets it off in a marvelous manner from its background of chalk as well as from its handle (fig. 10). The prototype of this ax was evidently a small stone celt set in a staghorn handle. Similar representations of the hafted ax were found in four other caves. In at least one case it replaces the mammæ, just below the necklace, on the breast of a human figure of the type noted above.

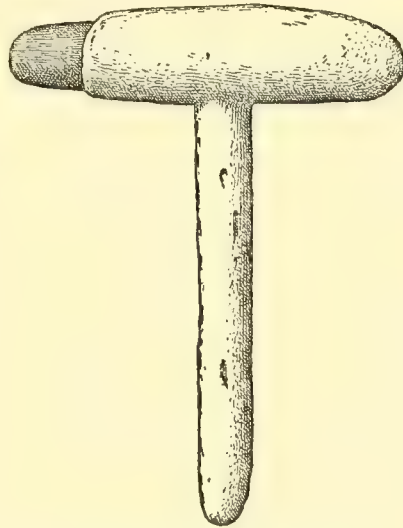


FIG. 10.—Hafted ax engraved on the wall of an antechamber to a funeral cave, near Coizard, Marne. The blade of the ax is painted black. $\frac{1}{4}$. (After de Mortillet; from J. de Baye.)

Among the sculptured figures on the megalithic monuments of Europe, the ax plays an important rôle. In some cases the hafted ax is represented, in some the ax-blade alone, and in others the handle alone. On the interior face of a stone serving as a partition between the chamber and the corridor of the Penhap dolmen (Morbihan) is the engraved figure of an ax apparently set in its sheath. Its position with respect to the funeral chamber recalls the figures of the ax placed inside the portal of the artificial cave at Coizard (Marne).

One of the most satisfactory representations of the hafted ax was found on a small stone above the sixth support on the right side of

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the gallery in the dolmen of Gavrinis (Morbihan). The blade is set in the handle through which the pointed pole projects. The handle is sharply recurved at its haft end, resembling in form a crozier (fig. 11). The same style of handle is found in the lake-dwellings of Switzerland. An excellent example in its original wooden handle, found in the bed of an ancient lake in Cumberland, is reproduced by Sir John Evans.

The sculptured figure of a hafted ax decorated the under face of the great "table" stone of the dolmen des Marchands (Morbihan). This and four of the eight figures of the ax sculptured on a stone at

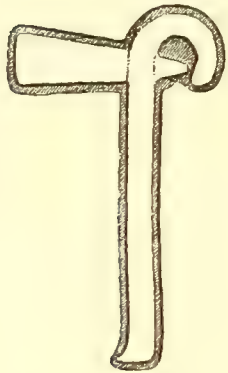


FIG. 11.—Hafted ax engraved on a small block of granite; from the dolmen of Gavrinis, Morbihan. $\frac{1}{2}$. (After de Mortillet.)

the entrance to the dolmen of Mané-Hroëck, at Locmariaquer (Morbihan), are hafted in a manner similar to the foregoing, with the difference that in several the recurved end of the handle is made to fuse with the end of the pointed poll. This type is repeated in the dolmen of Kerverez, which by no means exhausts the list of hafted axes represented on the megalithic monuments of Brittany. An example of the hafted ax not unlike the type from Brittany reappears on one of the dolmens in Charente. Sculptured figures of the ax without the handle appear in the Morbihan (at Gavrinis), in Charente (dolmen de la Grosse-Perotte, Fontenille), and Seine-et-Oise (dolmen du Trou-aux-Anglais, Épône). When visiting the late Paul du Chatellier at Kernuz, Finistère, the author recalls having seen in the Chatellier collection a bronze

ax and handle all in one piece.

The stone age of Scandinavia offers many examples of the symbolic or ceremonial ax. This is to be expected when one recalls that the symbol of Thor, one of the most important gods of the north, was the hammer-ax, which was likewise the symbol of the sun-god. Amber beads in the form of an ax or hammer are reported from various parts of Sweden; and an amber ax three and a quarter inches long (8.3 cm.) from Bohuslän has been reproduced by Montelius. The same author figures representations of the hafted ax taken from rock sculptures in Sweden; also a large ax of thin bronze cast over a clay nucleus, which never could have served a practical purpose. According to J. J. A. Worsaae, certain extremely heavy and highly ornamented Danish axes of bronze with awkwardly placed handles could not have been employed as weapons or as ordinary tools. At Kivik in southern Sweden there is an unusually large tumulus,

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within which is an ample chamber formed of flat stones set edgewise. The inner faces of these stones are covered with groups of engravings, each surrounded by a panel. On one of these stones, above the figure of a ship, an aniconic symbol in the shape of a short-based triangle (as if representing a portal) is flanked by hafted axes. The position of the two axes, with blades turned toward the central symbol, recalls that of the hafted axes flanking a portal to one of the artificial neolithic caves of the Marne, mentioned above. The Kivik monument dates from the bronze age.

Numerous small symbolic hammer-axes belonging to the late neolithic period and the first phase of the bronze age form one of the distinctive features of the ceramic art of Ukraine (Russia) and of the Siebenbürgen (Transylvania). Gravestones from Villafranca, Liguria, dating from the first iron age, are rudely carved to represent a warrior holding in one hand his battle-ax.

In the Ægean regions the common form of the votive ax is the bipennis, or ax with two blades, one opposite the other. The bipennis is often depicted in the hands of Amazons, and likewise attributed to Hephæstus, or Vulcan. In a cemetery of the Second Late Minoan period, recently discovered at Isopata on the edge of the plateau that overlooks the site of ancient Knossos (Crete), there is a tomb containing a solitary rock-cut cist apparently intended for a single occupant. Evidence is not lacking however that it was a sanctuary tomb; for in the chamber were found a bronze double ax, two simulacra in bronze of the double ax, ceremonial vessels of clay, and other objects of votive significance. Remains of its wooden shaft were still preserved in the centrally placed socket of one of the bronze votive axes. Among cult objects in Cretan shrines bronze double axes usually occur in pairs as pointed out by Sir Arthur Evans. But the most remarkable thing about this tomb is that the rock-cut cist itself is in the form of a bipennis or double ax, hence the appropriateness of its name: "The Tomb of the Double Axes." The walls of the cist are in each case slightly but regularly curved, the sides inward, the ends outward, giving the exact outline of a double ax. The painted sarcophagus of

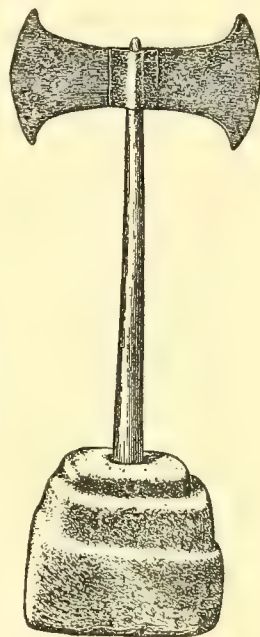


FIG. 12.—Double bronze votive ax set in a stepped steatite socket; from the Dictæan Cave, Psychro, Crete. (After Evans.)

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Hagia Triada illustrates an offering scene before two large double axes set in stepped pedestals. The cult of the dead and the divinity or divinities of the Double Axes are thus in direct association (Evans). Actual stepped pedestals of steatite, similar to those for the double axes depicted on the sarcophagus of Hagia Triada, were found in the Dictæan Cave, Psychro (Crete), in association with double axes. A complete example from the Dictæan Cave, obtained by Sir Arthur Evans in 1899, is reproduced in figure 12.

At Knossos are pillar shrines of masonry covered with incised figures of the bipennis. That the double ax at times also stood as the visible impersonation of the divinity is the belief of Evans, who cites as an illustration a painted Mycenæan vase now in the British Museum, recently found at Old Salamis in Cyprus. A detail from this



FIG. 13.—Double ax mounted on "horns of consecration," between bulls' heads, from which rise similar axes. Mycenæan vase, Old Salamis, Cyprus. (After Evans.)

vase is seen in figure 13. The ornamentation consists of the repeated delineation of the double ax set between pairs of bulls. In each case the ax rises from a distinctive piece of Mycenæan ritual furniture known as "the horns of consecration". Each bull likewise has a double ax between his horns.

A good example of the exaltation of the double ax appears on the fragment of a steatite mold found at Siteia in Crete and reproduced by S. Reinach.¹ The priest or priestess holds aloft a bipennis in each hand.

Dr Atgier quotes Dr Bertholon of Tunis as saying that among the ancient Lybians the ax, at first of stone, later of metal, was the symbol of the female divinity.

Among the Egyptians, one of the insignia of royalty or of command was the ax. Maurice Delafosse² notes probable traces of Egyptian civilization in the Ivory Coast region, where chiefs never appear at important functions without being provided with one or several attributes of power,



FIG. 14.—Parade ax of worked copper; from the upper Baule district, Ivory Coast. (After Delafosse.)

¹ *La Crète avant l'histoire*, *L'Anthropologie*, XIII, p. 26, 1902.

² *L'Anthropologie*, XI, 546, 1900.

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resembling those known to Egypt. The most dominant of these in the upper Baule district is the parade ax of worked copper, with a ring at the grip end suggesting the scepter of the god Ptha (fig. 14).

Thus both in the Old World and in the New, in the past as well as in the present, the ax has been man's faithful ally; a weapon of attack and defense, a useful tool; a symbol of power and protection, as well as of sacrifice, fit emblem of the gods. No wonder that during the Middle Ages, and even later, stone celts were looked upon as having fallen from the sky, as being veritable thunderstones.

YALE UNIVERSITY
NEW HAVEN, CONNECTICUT

The Distribution of an Arawak Pendant

By CHARLES W. MEAD



IN the shell-heaps and caves of the West India islands have been found such cylindrical stone pendants as are shown in plate 1, nos. 1, 2, 3, and 5. The archeological collections from the islands of Jamaica and Porto Rico, in the American Museum of Natural History, contain a number of these objects. Although they are always spoken of as cylinders, all that I have seen are a trifle larger in the middle, tapering to the ends.

In those from Jamaica (nos. 1, 2, 3) the perforation for the suspending cord is bored through a short distance from one of the ends. The peculiarity of this hole is that the boring is done entirely from one side, while the other stone objects in the collections were drilled in the usual primitive way—from both sides. This is probably accounted for by the fact that the smooth, rounded surface of the cylinder made it very difficult to start the hole, as the point of the drill would have a tendency to slip off until a beginning had been made. It was found easier to continue drilling from one side than to make another beginning on the opposite side. I shall speak of this drilling again.

The pendant numbered 5, from Porto Rico, is perforated in the usual way of primitive peoples: a boring in one end is met by one from the side. The lower end shows that the first attempt was unsuccessful: that in trying to meet the hole in the end by drilling one in the side a piece was broken off.

According to the best information we have, the original inhabitants of both Jamaica and Porto Rico were of Arawak stock, and the artifacts we are considering are believed to belong to that period. It must be remembered, however, that the pure-blood Arawaks of both islands were exterminated in early times, and their place taken by a mixed race of Arawaks and Caribs.

Dr Fewkes says: "While the art products of the Antilleans are *sui generis*, they are more characteristic of the Arawaks than of the Carib people of South America."¹

Dr Fewkes applies the term Taino to designate the original sedentary people of the West Indies, as distinguished from the Carib or any mixture of the two. He says: "It should be borne in mind that

¹ *American Anthropologist*, N. S., vol. 5, no. 4.



STONE PENDANTS (1-3, 5) FROM THE WEST INDIES AND (4) FROM COLOMBIA

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the insular Carib differ somewhat in language, blood, and culture from those of the mainland of South America, since most of them were the offspring of Carib fathers and Tainan mothers, who were slaves. The captive Tainan women incorporated their arts in the Carib life, naturally developing a close similarity between the various mixed Carib and Tainan cultures."¹ This being the case, it is possible that these pendants were made by the Caribs or by the mixed race of Arawak and Carib. Many of the stone objects from the West Indies seem to be characteristic of both peoples.

Let us now turn to the northern part of South America. As so much of this section is peopled by tribes of both Arawak and Carib stocks, we should naturally expect to find some similarities in the arts, foods, etc., between the continental and insular peoples, and this is the case. Throughout the Guianas, Venezuela, and Colombia, for example, the chief articles of food were maize, potatoes, and manioc. This is true also for the West Indies. The animals of the islands used for food were doubtless derived from South America, and numerous examples could be cited to show similarities in culture.

Among prehistoric objects perhaps the best known example of similarities is found in the hatchet with its handle made from a single piece of stone. The American Museum of Natural History has a remarkably fine specimen of this form of hatchet in the George J. Gibbs collection, from Caicos island. It has been figured and described by Prof. O. T. Mason.² From the Santa Marta region of Colombia the Museum has three specimens. In workmanship these are much inferior to the Caicos hatchet.

Between the eastern coast of South America and Colombia no specimens of these hatchets or of the pendants under discussion have been reported; but this does not disprove their existence, for as a matter of fact the ethnology of this region is very imperfectly known, and of its archeology we know practically nothing.

The stone pendant shown in no. 4 is another object which, like the hatchet mentioned above, would seem to connect the peoples of northern South America with those of the West Indies.

This pendant, which comes from the upper Rio Caiary-Uaupés, in Colombia, is in the collection gathered for the Museum by Messrs Schmidt and Weiss. Mr Hermann Schmidt, ethnologist of the expedition, informed the writer that it had a wide distribution on the western tributaries of the Rio Negro. In some localities it served as the insignia of the chief, but in some places it was worn by all the

¹ *Twenty-fifth Ann. Rep. Bur. Amer. Ethnology*, p. 26.

² *Smithsonian Rep. for 1876*.

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men. It is commonly known as the quartz cylinder, and has become familiar to all anthropologists through the work of Dr Koch-Grünberg.¹

Neither the one shown here nor those figured by Dr Koch-Grünberg and others are perfect cylinders; they are always larger in the middle than at the ends, but lack the graceful lines of the West Indian pendants.

Dr Koch-Grünberg's explorations were carried on in the north-western part of Brazil and on the western tributaries of the Rio Negro in Colombia. His linguistic map² of this region shows that dialects of the Arawak stock are spoken in fourteen, and dialects of the Carib stock in four of the localities visited by him.

At a settlement on the Rio Tiquié Dr Koch-Grünberg saw one of these pendants made. He says:

I saw here the process of making the quartz cylinder that nearly all the male inhabitants wear about their necks. The bright white stone comes from a place on the left bank of the Tiquié deep in the forest, in the earth. A suitable piece is broken off, and the required form given it by blows of another piece of quartz. The blows are lightly given by a stone the size of a fist, which has been rounded off by much use, in the same way as if one desired to strike fire. Then the cylinder is ground on sandstone and polished with fine sand or pumice from the upper Solimões, which is brought in small quantities to the Uaupés Indians from this long distance over the Yapurá. Thus far the preparation of the quartz cylinder has been the tedious work of many months, because the Indian only now and then finds time to work on it. Not less tiresome and slow is the work of perforating it.

The Indian holds the cylinder firmly on the ground with his feet, and with both hands twirls a stick of Paxiuba wood on the hard stone, while from time to time he adds fine white sand, but no water. In beginning the perforation a small lump of pitch is placed on the rounded slippery quartz, that the stick, while being twirled, shall not slip off before the hole is deep enough to hold it in place. A number of Paxiuba sticks are necessary to complete the boring, as they must be continually repointed.³

On the same page Koch-Grünberg states that the cylinders are rarely perforated through their length, and that these are considered very precious by the Indians. It is interesting to note that one in the Museum's collection from the Island of Jamaica is thus perforated; it has a second boring near one end to meet the long one.

The prehistoric cylindrical pendants from the West Indies, and those in use today in northwestern Brazil and in parts of Colombia,

¹ Zwei Jahre unter den Indianern.

² Ibid., vol. I, facing p. I.

³ Ibid., vol. I, p. 326.

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have a striking peculiarity in common. In making the perforation the drilling stopped as soon as the point of the stick came through. A piece of stone or other hard substance was then inserted and the hole slightly enlarged; but it is always smaller than the bore through the stone, and very irregular in shape.

As tribes of Carib and Arawak stocks occupy today and have occupied in the past so great an extent of territory in South America, I think that the pendants under discussion may be looked for in various localities when our knowledge of this part of the world shall have increased.

AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK CITY

Notes on the Piegan System of Consanguinity

By TRUMAN MICHELSON



ALTHOUGH much has been written on the Piegan system of consanguinity, I think all ethnologists will agree that the data are more or less conflicting; so that after all our real knowledge of the system is next to nothing. I believe that in the circumstances a review of the existing literature may not be entirely unwelcome, even if most of what I have to offer is destructive criticism rather than constructive synthesis. It will at least clear the way for future investigations of the system. Practically all the data on which the present writer bases his criticisms were obtained in the winter of 1916. The informants were Mountain Chief and Richard Sanderville; the latter served also as interpreter. The published literature on the Piegan system of consanguinity is as follows: Morgan, *Systems of Consanguinity*, 1871; Tims, *Grammar and Dictionary of the Blackfoot Language*, 1889; Grinnell, *Blackfoot Lodge Tales*, 1892; Wissler, *The Social Life of the Blackfoot Indians*, 1911;¹ Curtis, *North American Indian*, vol. VI, 1911; Uhlenbeck, *Flexion of Substantives in Blackfoot*, 1913,² and Spier, *Blackfoot Relationship Terms*, 1915.³ For the benefit of those who are not specialists, it may be added that Piegan, Blood, and Blackfoot are dialectic variations of one major division of the Algonquian stock.

We will review the published literature in the order of sequence given above. My criticisms are based on direct interrogations as well as on my own schedules.

At the time Morgan obtained his information, conditions for ethnological research were very trying, and it must be remembered that Morgan was a pioneer in American ethnology. The following remarks are not intended to disparage his work, which indeed formed the foundation for the study of the sociology of the American tribes, but are made in the interest of scientific truth and also because of the weight given his name in European circles. It cannot be denied

¹ *Anthr. Papers Amer. Mus. Nat. Hist.*, vol. VII, pt. 1.

² *Verhand. d. Kon. Akad. v. Wet. te Amsterdam*, Afd. Let., N.R.D. XIV, no. 1.

³ *Amer. Anthr.*, N. S., XVII, p. 603 f.

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that some of Morgan's schedules are of lasting value, but unfortunately this cannot be said of his Piegan schedules.

To begin with, Morgan labored under the necessity of employing a Cree half-breed as interpreter, and the informants were the latter's wife, a Piegan, and their daughter. Now, as the Cree system of consanguinity differs greatly from that of the Piegan, and inasmuch as the sex of the speaker at times is important, it will be seen that confusion was inevitable. The Blood schedules suffer from the defect that no male informant was employed; but it should be understood that my criticisms are aimed only at the Piegan schedules, as I have no independent data from the Bloods. The phonetics are extremely crude, and will not be considered unless vital to the point at issue. To go into some details: On page 294 the term given for "grandfather" (*no-bes'-sib-ä*) is unknown to my informants; and other investigators have not recorded it. In this connection it may be mentioned that the Blood term is the equivalent of terms recorded by Tims, Grinnell, Wissler, Uhlenbeck, and Michelson, but the translation thereof is too restricted in meaning (see below). The term for grandmother (p. 295), *ne-tä-ke-ä'sä*, though not given in the published literature elsewhere, is nevertheless confirmed by my notes. *Nee-so'-tan* (p. 296, in the column for "my grandson"), with the translation "my grandchild", is an error; according to Tims and Michelson (the only two others who have recorded the word under discussion) the word applies only to a female, and is given correctly by Morgan under "my granddaughter" (p. 297). For a more extended use of the term, see below. The same mistake occurs in Morgan on pages 298 and 357 under schedules 15 and 193. The term for "my elder brother" (pp. 298, 299) is patently the term for "my younger brother, sister" with a female speaker, as shown by the records of Tims, Wissler, Curtis (see below), Uhlenbeck, and Michelson. As mentioned in a case above, the Blood record by Morgan, though differing from his own Piegan one, is nevertheless confirmed by other writers. The word given for "my elder sister" (p. 299) is opposed to the information of Tims, Grinnell, Wissler, Curtis, Uhlenbeck, and Michelson, all of whom are in agreement save as to the phonetics of the word. As the word occurs twice on the same page it could hardly be a misprint, though it may be a bad mishearing (*ni'n^esta^{ea}*, Michelson). The terms for "my younger brother, younger sister" have been badly confused (see pp. 300, 301). Grinnell shares the same mistakes. The agreement of Tims, Wissler, Curtis (for a partial error, see below), Uhlenbeck, and Michelson cannot be overthrown. The point is that with a male speaker there is one term for "my younger brother" and "my younger

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sister"; and with a female speaker there is also a single term, which however is different from that used by a male speaker. Morgan's term for "my younger brother" is correct with a male speaker; as is the term for "my younger sister" with a female speaker. In these cases Morgan's Blood schedules are no better than those for the Piegan. The mistakes here are precisely the kind that would occur in trying to obtain male terms from females (see above). These same mistakes naturally occur where the same words are given with different meanings (e.g., pp. 314, 315, 316, 317). The term given for "my brothers" (male or female speaker) is not recorded by other investigators. The present writer has recorded a term for this with a female speaker only, which is entirely different from the one given by Morgan. The word given (p. 302) for "my sisters" (male or female speaker) is unintelligible to my informants. It may be added that Tims, Uhlenbeck, and Michelson are in agreement as to another word with this meaning, save that, according to Michelson's information, the word is used by a male only. The term given on the same page for "my brother's son", with male speaker, is the one, according to the present writer's information, a woman will apply to her sister's son, or a man to his "chum's" son (see below). The word given for "brother's son's wife" (p. 303) (*nee-mis'*) is probably correct if the *i* is a mishearing for a glottal stop. *N'-to'-to-tun* (ibid.), "my brother's daughter", with male speaker, is completely different from that obtained by the present writer. Not only is the word different, but implies a different scheme of relationships. It is to be regretted that other investigators have not recorded the equivalent of the term. The present writer's informants suggest the word given is a corruption of *nitō'kotā'ñ^a*, "my step-daughter", spoken by either sex; otherwise it is unintelligible to them. The word *nīs* (ibid.), "my brother's daughter's husband" with male speaker, looks like a variant obtained by Michelson for "my brother-in-law" with female speaker only (*nīs*; see below, however). On pages 304 and 305 the term translated as "my grandchild" contains the error as noted above in the criticism of page 296. The term given on page 305 for "my sister's son" (male speaker) according to Michelson's informants means "my sister's son-in-law". On page 306 the word given with the meaning "my sister's daughter" (male speaker), really means "my sister's daughter-in-law" according to Michelson's information; the word *nīs* "my sister's daughter's husband" is also due to some misunderstanding according to the latter's information. On page 308, *n'-do-to-yose*, "my brother's son", female speaker (see also p. 305), really is the term for "my brother's son-in-law". The word given for "my grandchild" (pp. 312,

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313) contains the same error pointed out in the discussion of page 296. The term for "my father's brother" (p. 313) is completely different from the one given by Michelson's informants. Morgan was entirely right in giving "my father's brother's children" as "my brothers and sisters" (see pp. 314-317), but the actual terms given contain the same errors pointed out in the criticism of pages 298, 299, 300, and 301.

Morgan's Blood records, as noted above, are somewhat better than his Piegan ones. The term given for "my father's sister" (p. 322) is wholly different from that recorded by Michelson. Phonetically it resembles the term given by Morgan for *ne-to-tah'-se* "my father's sister's husband". Compare also the remarks by Spier. Hence there can be no doubt that a mistake has occurred owing to some misunderstanding. It may be noted that the word for "my father's sister's son" (p. 323), with female speaker, is the same as that given by Grinnell to mean "my daughter-in-law, my sister-in-law"; and the one recorded by Michelson with the meaning "my wife's sister" (not also "my brother's wife"). Etymologically the word means "my far-away-wife", which certainly is good evidence that Morgan's information is faulty, especially as among the Piegan a man's wife's sisters are his potential wives. This ethnological fact supports Michelson's information as opposed to that of Grinnell. The Blood equivalent recorded by Morgan (*no-in'-nä*) is unquestionably the same as the Piegan term for "my brother, my mother's brother", female speaker, recorded by Michelson (*noyi'ñāw^a*). Schedule 96 (p. 325) contains the same error pointed out in the discussion of page 299. The term given in schedule 101 (p. 326) must be a mistake if Michelson's information is correct. The word given for "my mother's brother" (p. 330) is certainly due to some misunderstanding. The Blood term is confirmed by Grinnell, Wissler, and Michelson. The term given on page 339 for "my mother's sister" is opposed to the information of Wissler, Curtis, and Michelson. Grinnell also partially coincides with these last. Morgan is quite right in giving the scheme that one's mother's sister's children (pp. 340, 341, 342, 343) are one's brothers and sisters, but commits the same errors as pointed out in the criticism of pages 299-301, inclusive. The word *ne-tä'-so-ko* (p. 371), meaning "my wife's father", has no equivalent by other writers. It should be noted, however, that, as in a few other cases, the Blood term recorded by Morgan can be substantiated as opposed to the Piegan one; it corresponds to the Piegan term recorded by Grinnell, Wissler, Uhlenbeck, and Michelson. The error is probably due to the use of the half-breed Cree interpreter. The writer cannot suggest

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what the term given actually means. Similarly the term given for "my wife's mother" is opposed to the information of Tims, Grinnell, Wissler, Uhlenbeck, and Michelson. The term given for "my husband's brother" (p. 378) is right, according to Michelson's information, only when the husband and his brother are twins. When they are not twins, there will be two separate terms, according as to whether the husband's brother is older or younger than himself. The term for "my wife's brother" (p. 379), singularly enough, is correct, while the Blood correspondent really means "my sister's husband". Similarly, on page 380 the Piegan word in schedule 260 is correct, but the Blood word means "my sister's husband", and "my husband's brother" if the husband and his brother are twins. For an extended use of the term, see below. The term given on the same page for "my husband's sister" really means "my brother's wife". Similarly, the term given for "my brother's wife" with male speaker really is that for "my wife's sister".

It will not be necessary to criticize the Piegan "indicative features" discussed by Morgan (pp. 225, 226), for it will be seen from the above that practically every statement proceeds from faulty data.

After the unpleasant task of pointing out the defects of Morgan's Piegan schedules, it is no more than fair to give a list of such terms as are fully confirmed by the present writer. These are the ones corresponding to my grandmother, father, mother, son, daughter, younger brother (male speaker), younger sister (female speaker), brother's son's wife, sister's son's wife, father's sister's daughter's husband, son-in-law, daughter-in-law, sister's husband, wife's brother, wife's sister, and brother's wife (female speaker). It will be noticed there are some schedules which the present writer can neither refute nor confirm.

We next come to the work of Tims. First of all, it should be stated that only a comparatively few terms of relationship are given in the dictionary. The phonetics, though an improvement on those of Morgan, naturally are not of a very high order. Disregarding these, the words given for the following are entirely correct: my elder brother, younger brother (male speaker), younger sister (male speaker), younger brother (female speaker), younger sister (female speaker), elder sister, husband, son-in-law, son, daughter, daughter-in-law, grandson, granddaughter, mother, mother-in-law, father, wife, grandparent. The term given for brother-in-law with male speaker is correct when applied to sister's husband, but not so when applied to wife's brother. In specially mentioning the sex of the speaker, Tims has scored against Grinnell and Uhlenbeck. The present writer is

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not wholly certain whether the term given for brother-in-law, with female speaker, is justified. According to Michelson's information the term given for "my sister" should be qualified with "male speaker", though Uhlenbeck does not do so. The terms given for nephew and niece are simply built up from different words, namely, elder brother's son, sister's son; elder brother's daughter, sister's daughter. The present writer cannot confirm the term given for "my grandchild" without specifying the sex; yet etymologically it clearly is related to the term given for "my grandson". Summing up, we must say that so far as accuracy in the application of the terms given is concerned, Tims's work is a distinct improvement on that of Morgan. Note especially that the terms for "my younger brother, sister" are correctly distinguished by the qualifying statement whether the speaker is male or female.

Turning now to Grinnell's list, it should be said the principal terms are given. Naturally in a popular book such as his, we cannot expect very refined phonetics; but it should be noted at the outset that the term given for "son-in-law" coincides with the one for "my elder brother" (and "my uncle") only because of inaccurate phonetics. The information of both Uhlenbeck and Michelson makes this absolutely certain. In cases where it is imperative to know the sex of the speaker, we are without this information. Thus the terms given for "my younger brother" and "my younger sister" are correct if the speakers are male and female respectively; but no intimation is given of this, nor that the terms would be different according to the sex of the speaker. As this matter is treated at some length above in the discussion of Morgan's schedules, it is unnecessary to go into this further. The term for "my aunt" is correct for "my maternal aunt" only, as is shown by the information of Wissler, Curtis, and Michelson. That for "my daughter-in-law" is opposed to the information of Morgan, Tims, Wissler, Uhlenbeck, and Michelson. According to the last, the term given means "my wife's sister", "my chum's wife", "the wife of a co-member of my society". For the meaning Morgan gives to the term, see above. The term given for "my brother-in-law" suffers from the following defects: (1) the sex of the speaker is not noted; (2) "my wife's brother" and "my sister's husband" are not the same with a male speaker, nor are "my husband's brother" and "my sister's husband" with a female speaker, unless the husband and his brother are twins; (3) older and younger brother-in-law are artificially distinguished: the term for "my brother-in-law younger than self" has the simple diminutive suffix, and is derived from the term given for "my brother-in-law older than self". Other

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writers have not discovered such a distinction; and it is surely due to a leading question. The term given means "my sister's husband" with male speaker. The word given for "my sister-in-law" suffers from similar errors. The term given for "my second cousin" is due to an error of some sort: *nimp'sa* doubtless corresponds to Michelson's *ni'm^εsa^{εα}*, for the meaning of which see below. The term given for "my uncle" is correct according to Michelson's information, but according to Wissler it is not. The words given for the following are certainly correct: my grandfather, my grandmother, my father-in-law, my mother-in-law, my son, my daughter, my son-in-law, my wife, my husband. Grinnell is quite right in stating that cousins are the same as brothers and sisters; but owing to the errors noted above, naturally the same errors would reappear. Summing up, we must say that Grinnell's work does not show much advance on Morgan's. In a popular book we naturally should not expect a discussion of discrepancies with other writers.

Coming now to the work of Wissler. In the first place, in a strictly scientific paper we should have expected Wissler to take full account of discrepancies between his own statements and those of previous writers. Secondly we should have expected a rather more complete account than we actually have. The phonetics are inadequate, but this rarely has completely disguised words. Wissler's arrangement of his material is good. The present writer ventures but rarely to criticize Wissler's terms with female speaker, owing to the male sex of his own informants. The term *niksō'stak*¹ is given with the meaning, with male speaker, "my mother and her sisters; wives of my elder brothers, brothers of my father and of my mother". The word corresponds to Michelson's *niksi'sta^{εα}*, and Morgan, Grinnell, Tims, Curtis, and Uhlenbeck record an *i* in the second syllable. Michelson has recorded this word with the meaning of "my mother, my mother's sisters". According to his information no distinction is made between "my elder brother's wife" and "my younger brother's wife"; and as Morgan also does not, it should be left an open question as to whether Piegan actually makes such a distinction. According to Michelson *nicinnaua^{xs}* is a mishearing for *nitsi'ñā^{εα}xs*, which has the meaning assigned by Wissler to the former. As pointed out by Uhlenbeck, the differences between *ni'nst ni'nsta*, *naa'xs naa'xs* are not due to the sex of the speaker, but to difference of case. According to Michelson the meaning of *ni'nst* is rather more extended than given by Wissler, and includes also elder daughters of my father's and mother's sisters. The word *naa'xs*, according to the former, includes also my

¹ See Uhlenbeck in *Internat. Archiv f. Ethnographie*, xx, 205.

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paternal or maternal granduncle and grandaunt. Michelson's information extends *naa'xsa* (female speaker) to include husband's sister (younger or elder) and husband's brother (elder). *Nitaw'tojombp*, "husbands of my sisters" (female speaker), is probably a corruption of *nitō'toyōm^a* (Michelson), which however has a slightly more extended meaning (see above and below). Wissler deserves credit for not taking the word to include husband's brothers. *Nimps* (*nim^εsa^{εa}*, Michelson) is probably too restricted meaning with male speaker: with a female speaker, according to Wissler, it applies to wives of my brothers, without any specification as to older or younger; according to Michelson with male speaker it does the same. According to Tims, Michelson, and Curtis (for a partial error see below), *nī'skōn* "my younger brothers", etc., with male speaker, includes also "my younger sisters". That this last is correct is confirmed by the fact that Wissler has no term for "my younger sister" with male speaker; and that by his own testimony the term is applied by a male speaker to his younger first cousins by brothers of his parents, irrespective as to the sex of these cousins. According to Michelson the term includes all of "my younger first cousins", which is supported by the use of *nīssī'ssa* (female speaker), which as attested by Wissler does include them. Primarily it means "my younger brother, my younger sister". According to Michelson *nī'skōn* does not include "younger brothers of my father" any more than *nīssī'ssa* does. For an extended use of *nī'skōn*, see below. According to Michelson *nī'ssa^x*, with male speaker, embraces "all the brothers of my father as well as my mother"; exactly as, according to Wissler's own testimony, the word with a female speaker will do this very thing. This is confirmed by the fact that no term is given by Wissler with a male speaker for "my father's elder brothers". Sanderville, one of Michelson's informants, was unable fully to explain the meaning of Wissler's *nitau'ka^xs* (*nitō'kaxs*, Michelson); he denied absolutely that it meant "my mother-in-law", but thought it meant "my mother-in-law's near kinsman, kinswoman". He was also sure it did not mean "real grandmothers". *Nīstōmmo'wak* is given by Wissler with the meaning "husbands of father's and mother's sisters; also my sister's husband" (male speaker). Michelson has recorded an equivalent of this with the meaning "my sister's husband" (male speaker). However, from his other schedules he feels sure that the term is applicable to "my father's sister" (male speaker), but is doubtful if it can apply to "my mother's sister's husband". Wissler deserves praise for restricting the term to male speakers only; *per contra* Grinnell and Uhlenbeck are wrong in not so doing. Wissler also is to be commended for not grouping "my

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sister's husband" and "my wife's brother" in a single term "my brother-in-law" as some writers on the Piegan system have done. The word given for "my father" needs no criticism. Summing up, it may be said that though Wissler's work is well arranged and is a distinct advance in some ways, the schedules are not so complete as they should be, and the meanings given the words in some cases appear to be rather too broad, and in others too restricted.

Curtis's contribution to our understanding of the Piegan system of consanguinity may be briefly discussed. No attempt was made to give more than a few schedules; and obviously his work was not intended for the professional student. Nevertheless in determining the cases, Curtis made a real contribution, and also anticipated Uhlenbeck. It should be mentioned that he agrees partially with Wissler in the terms for "paternal uncle" as opposed to Michelson and Grinnell—partially because Wissler has recorded no term for "elder brothers of my father" with male speaker; on the other hand Curtis's distinction between "mother's younger brothers" and "mother's elder brothers" is opposed to the information of Grinnell, Wissler, and Michelson. Morgan's Blood schedule confirms the latter writers. See the discussion above. A serious fault is committed by Curtis when he inserts after certain terms 'masculine pronouns', 'feminine pronouns'. "Masculine speaker" and "feminine speaker" are what should have been said, for sex gender is unknown to Algonquian languages. Moreover, the pronominal elements of the words cited this way are the same. The term given for "paternal aunt" is opposed to Michelson's information, nor does it agree with the one given by Morgan. Curtis agrees with Wissler and Michelson in the term given for "maternal aunt". As might be expected, the phonetic system employed by Curtis is deficient, but it is also true that refined phonetics would have been unintelligible to the audience he reaches.

We now come to Uhlenbeck's work. The Piegan terms of relationship cited by Uhlenbeck are only incidental to a grammatical study, and are not intended as a systematic exposition; hence the broader meanings of the terms cited are ordinarily not given, for this would have been foreign to his purpose. In one case (*nistamóa*), to wit, "my brother-in-law", the term should have been qualified by the addition of "male speaker", and the meaning should have been given as "my sister's husband", for it does not include "my wife's brother". See the discussion of the same word in the criticism of Wissler's work. According to Michelson the term given for "my sister", without specifying whether older or younger than self, should be qualified by the addition of "male speaker". Otherwise the present

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writer confirms all terms given by Uhlenbeck. Uhlenbeck is to be congratulated on independently discovering the allocative cases of the terms of relationship, though anticipated by Curtis in this. The phonetics employed are immensely superior to those of his predecessors. The glottal stop in *ni''sa*, "my elder brother", distinguishes the word nicely from *nisa*, "my son-in-law"; and the present writer is happy to confirm it. See the discussion of Grinnell's work. The phonetic system of Uhlenbeck was reviewed some time ago by the present writer, so there is no need of doing so here, except to add that occasionally the present writer hears a resonant vowel after a glottal stop where Uhlenbeck records nothing. Examples are *ni'm^εsa^{εa}*, "my daughter-in-law" = *ni'msa*; *ni'εsa^{εa}*, "my elder brother" = *ni''sa*. Summing up, we may say that Uhlenbeck's work marks a distinct advance, and that it is a matter of regret that he did not give us a systematic account of the Piegan system of consanguinity.

Let us now turn to the work of Spier. He saw clearly that the existing published data were both deficient and contradictory; and it was his aim to re-describe the system on the basis of the published material in such a way that would be intelligible to investigators. Spier himself had no independent material to check that already published; and it was for this reason that the present writer gave his detailed criticism of Morgan, in spite of Spier's brief but scathing rebuke. Spier's work has recently been severely criticized by Uhlenbeck.¹ As Spier is not a philologist, Uhlenbeck has rightly criticized him for not apparently trying to get in touch with one who had, moreover, been among the Piegan, Blood, or Blackfeet. Uhlenbeck concludes his review with the statement that "his [Spier's] notes are absolutely valueless". The present writer regretfully has to give at least a qualified assent to this; but it should be borne in mind that his reasons for this are very different from those set forth by Uhlenbeck. Spier's attempt was commendable; his failure is due to two facts, viz., that he had no independent information, and that the published material was too poor to afford any basis for conclusions.² From the present writer's review of Morgan's work (*vide supra*), it will be seen that hardly a single statement based on Morgan's data is tenable: it is too invidious a task to repeat all the mistakes. It will also be seen that the Blood and Piegan systems do not differ from one another in the way Morgan indicates; and it will be observed that in most cases where Morgan's Blood schedules differ from those for the Piegan, the former can also be substantiated for Piegan.

¹ *Internat. Archiv f. Ethnographie*, 1915, XXIII, p. 140.

² See Lowie in *American Anthropologist*, N. S., XVIII, p. 148, Jan.-Mar. 1916.

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We now come to schedules recorded by the present writer. No attempt was made to obtain complete schedules with female speakers, as the informants were male. The schedules were nearly all verified twice. As this study was intended to be primarily one of kinship and not grammatical, the cases are not separated, e.g., *ni'm^{ea}sa^{ea}* and *ni'ms̄* occur under the former.

- 1 *ni'na^{ea}*, my father.
- 2 *niksi'sta^{ea}*, my mother, my mother's sister.
- 3 *ni'ei'sa^{ea}*, my elder brother, my mother's brother, my mother's brother's son older than self, my mother's sister's son older than self, my father's brother, my father's brother's son older than self, my father's sister's son older than self.
- 4 *niska'na^{ea}* (spoken by male only), my younger brother, my younger sister, all my cousins younger than self, all my nephews and nieces by elder brothers and sisters.
- 5 *ni'ta^{ea}kyēma^{ea}* (spoken by male only), my sister (hence including all my female cousins and nieces by my elder brothers and sisters?).
- 6 *ni'n'sta^{ea}*, my elder sister, my mother's brother's daughter older than self, my mother's sister's daughter older than self, my father's brother's daughter older than self, my father's sister, my father's sister's daughter older than self.
- 7 *nisi's'sa^{ea}* (spoken by female only), my younger brother, my younger sister, all my younger cousins (to be continued as under number 4?).
- 8 *noyi'n^{ea}nāw^a* (spoken by female only), my brother, my mother's brother (to be continued as all my male cousins?).
- 9 *nitaxkyē'mān*, my wife.
- 10 *ni'to'toxkyēmān*, my wife's sister, the wife of any fellow member of my society.
- 11 *no'mā^{ea}*, my husband.
- 12 *ni'to'toyō'm^a* (spoken by female only), my sister's husband, my husband's brother if the latter is a twin of my husband, my husband's chum.
- 13 *na'xko'e^{ea}*, my son (spoken by both sexes); when spoken by a female only it includes my husband's younger brother.
- 14 *ni'ta'n'na^{ea}*, my daughter.
- 15 *ni'soxko^{ea}*, my grandson, my younger brother's or sister's son (including the sons of all kinsmen in number 4?).
- 16 *ni'so'ētan'na^{ea}*, my granddaughter, my younger brother's or sister's daughter (including all the daughters of kinsmen in number 4?).
- 17 *ni'to'toxko'e^{ea}*, with female speaker: my sister's son; with male speaker: my chum's son.
- 18 *ni'tōxkoxko^{ea}*, my stepson.
- 19 *ni'tō'kola'n^a*, my stepdaughter.
- 20 *ni'sā^{ea}*, my son-in-law.
- 21 *ni'm^{ea}sa^{ea}*, my daughter-in-law, my brother's wife (male or female speaker), my sister's daughter-in-law (male speaker only), my brother's son's wife (female speaker only).
- 22 *ni'stāmō^{ea}* (spoken by male only), my sister's husband.
- 23 *ni'stāmō'xko^{ea}* (spoken by male only), my wife's brother.
- 24 *na'ā'xsa^{ea}* (spoken by female only), my husband's older brother, my husband's sister, older or younger.

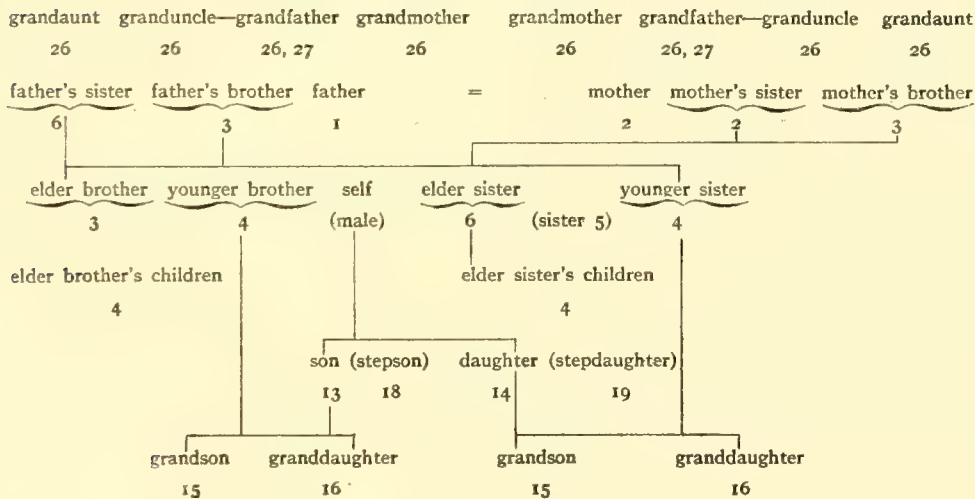
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- 25 *ni'ṣ*, my brother-in-law (spoken by female),? probable error.
 26 *na'a'xṣ*, my grandparents (both sides), my granduncles, my grandaunts (both sides in each case), my parents-in-law.
 27 *nitsi'ṇa^{ca}xs*, my grandfather, my father-in-law.
 28 *niṭāxso^{ca}ko^{ca}*, my father's brother's or sister's father-in-law or mother-in-law.
 29 *n'-do'-to'-yose* (taken from Morgan, probably *nito'toyōṣ* phonetically), my sister's son-in-law (male speaker), my brother's daughter-in-law (female speaker).

These schedules do not include every conceivable term, but they are at least sufficient to form a fairly accurate opinion of the system. As stated above, the terms with female speaker were obtained only incidentally; with female informants probably more could be obtained. Wherever terms are restricted to male speakers according to my informants, that has been noted.

The following diagram will show the system of the Piegan terms of blood-relationship, with ego a male. The numbers refer to the above schedules.

DIAGRAM OF PIEGAN TERMS OF BLOOD-RELATIONSHIP



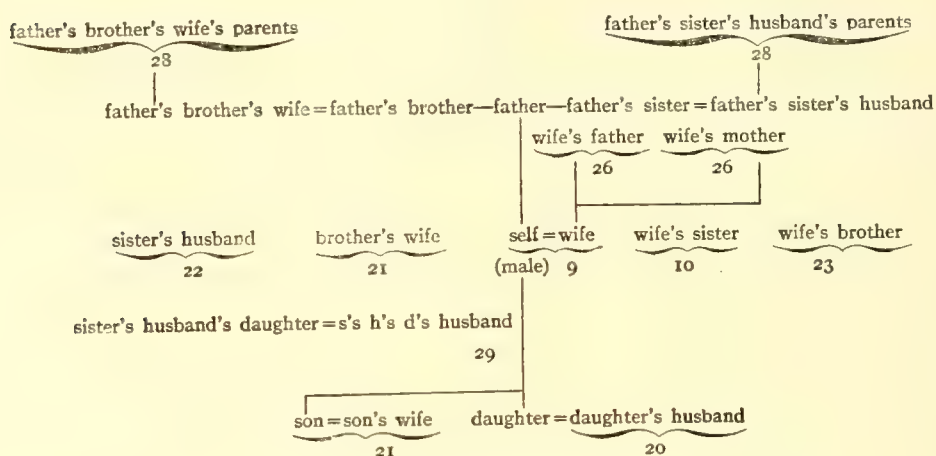
The next diagram presents a part of the Piegan system of relationship by blood. The numbers refer to those in the schedules above.

It is highly probable that *na'a'xsa^{ca}* (24) is only a case-form of *na^{ca}axṣ* (26). According to Professor Uhlenbeck, vowels are short before *x*; if so, the conjecture becomes a certainty. Obviously the terms for son, grandson, stepson; sister's son (female speaker);

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daughter, granddaughter, stepdaughter; wife, wife's sister; husband, sister's husband, etc. (12); sister's husband, wife's brother; and the terms under 26 and 27 are related. The element *toto* which occurs in many of these will be noticed. We are thereby in a position to infer with certainty a word *nitototan'na^{ea}*, which with a female speaker would mean "my sister's daughter", and with a male speaker "my chum's son". According to my interpreter the element *toto* means "far away, distant".

DIAGRAM SHOWING A PART OF THE PIEGAN SYSTEM OF RELATIONSHIPS BY BLOOD



An examination of the Piegan system shows very clearly that the essential factors governing it are consanguineal, not sociological. And this is what we might expect, as the Piegans are organized in gentes in the making. Exogamy has nothing to do with the system.

Morgan is wholly in error in considering that many old Algonquian words occur in the Piegan terms of relationship. This was due partly to his inadequate phonetics and partly to mistakes in categories. The terms for "my daughter", "my elder brother", are certainly old, possibly that for "my son" and less probably that for "my sister". Whether the term for "younger brother, sister", with female speaker, contains the stem of the old word with a different suffix is impossible to say definitely, owing to our inadequate knowledge of Piegan morphology. It will be remembered that the categories in the terms of relationship completely differ from the normal Algonquian ones. Taking into consideration the few terms which are old

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Algonquian we are faced with a linguistic problem, namely, What is the source of the new terms, and whence are the new categories? Arapaho and Gros Ventre can shed no light on this, for they have a number of old Algonquian words in their terms of relationship, and the categories are the old ones in at least many cases, even if both are more divergent Algonquian languages than Piegan. At present the source is unknown, but it may be suggested that Salish (especially Flathead), Kutenai, and Athapascan (especially Sarcee) be examined to see if they will shed any light on the problem. The possibility of other stocks influencing Algonquian categories in terms of relationship will be discussed elsewhere.¹

Those who believe marriage customs can be inferred from terms of relationship will doubtless make many deductions concerning such customs. From 21 of the above schedules they will conclude son and brother share the same wife; from 26 and 27, that a man married his own mother, from 4, 15, 16, that one's younger brothers and sisters married one's own daughters and sons; and other possibilities probably will present themselves. I do not in the least doubt that such extraordinary forms of marriage apparently occur in some quarters of the globe. But as such marriages are fundamentally repugnant to Piegans, there is no reason to regard the terms of relationship as a survival of such marriages, especially as the terms are, for the greater part, young, and not old Algonquian ones.

As said in the beginning of this paper, much that it contains is destructive criticism rather than constructive synthesis. But I shall be satisfied if I have at least cleared the field, and made a small contribution toward the final comprehension and understanding of the Piegan system of consanguinity.

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WASHINGTON, D.C.

¹ See *Proceedings of the National Academy of Sciences*, 1916, II, p. 299.

Exploration of the Tremper Mound in Scioto County, Ohio

By WILLIAM C. MILLS

INTRODUCTION



SITUATED five miles north of Portsmouth, on the west side of the Scioto river, in Rush township, Scioto county, Ohio, is the Tremper mound. The land on which it lies is a part of the estate of Senator William D. Tremper, of Portsmouth, which consists of more than 700 acres of the rich bottom-lands about the confluence of Pond creek and Scioto river.

The immediate site of the mound is a level plateau, about 70 feet above low-water mark of Scioto river. Looking westward from the summit of the mound upon the narrow valley of Pond creek, which threads its way between rugged hills upward of 500 feet in height, one is impressed by the powerful forces employed by nature in carving out this narrow watercourse, enabling the stream, fed by innumerable springs, to carry its excess of pure cool water to its junction with the Scioto. During glacial times Pond creek doubtless was an outlet for the water from melting glaciers, pushing down from the northwest, as well as for that from icebergs incident to the glacial period. These icebergs at times doubtless resulted in damming the flow of the torrent, and an extremely interesting illustration of this retarding influence is to be seen just a few hundred yards west of the mound. At the point referred to, a most impressive natural amphitheater, semicircular in form, 1000 feet long and 50 feet or more in height, marks the site along the eastern side of the valley of the stream, where the glacial flood, breaking the restraint of the ice, has carved its history.

At the intersection of the Scioto and Pond creek valleys, and just a short distance southwestward from the mound, is a fine spring of water. This spring doubtless played an important part in the life of the builders of the Tremper mound and of other dwellers, just as it has done in affording a never-failing supply of pure cold water to the early white settlers of that section, to their descendants, and to all who at the present time pass along the highway where it invitingly awaits the thirsty traveler.

At the site of this spring, in early days, was situated the Buck-

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horn tannery, where General U. S. Grant is said to have worked for a short time. According to Mr Frank Johnson, who was employed as a workman at the time of the exploration of the mound, his father, Lewis H. Johnson, was foreman of the tannery when General Grant was employed therein.

THE TOPOGRAPHY OF THE COUNTY

Scioto county for the greater part is broken and hilly. The Scioto river flows directly through the county, from north to south, to its junction with the Ohio river at Portsmouth. The mouth of the Scioto is 90 feet below the level of Lake Erie, while its waters at Columbus are more than 300 feet above the low-water mark of the Ohio, showing that the average fall per mile between Columbus and Portsmouth is more than three feet. The valley of the Scioto is the broadest and perhaps the most fertile of any of the rivers flowing into the Ohio.

The hills and ridges of Scioto county are simply the remnants of what once were continuous rock strata, now chiseled and sculptured by the tireless action of the water and other natural agencies. Man has furthered the transformation by denuding the hills of their tangled forests, so that on every hand, instead of woodland, are seen cultivated fields and pasture lands.

GEOLOGY

From an archeological viewpoint, Scioto county presents several interesting features as regards geological formations. Among these are the outcropping, along the east bank of Scioto river, of the Ohio pipestone (fireclay), and on the west bank of the river, of the Ohio black shale, the latter underlying the whole county.

The Ohio pipestone deposit extends over the eastern part of the county, beginning at the Scioto river, where the outcrop lies high up on the hills and gradually dips to the southeast, and continuing until in the eastern part of the county the outcrop lies low down near the base of the hills. The pipestone stratum varies in thickness from one and one-half feet to eleven feet, the average being three and one-half or four feet. In color it varies greatly, ranging from almost white, through all the various shades of color, to dark-red. The dark-red variety is scarcely distinguishable from the Minnesota pipestone. The Ohio pipestone was extensively used by prehistoric man in this region for making tobacco pipes. Of the 145 pipes taken from the Tremper mound, all but four were made from that material, the

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exceptions being three of coral limestone and one of fine-grained sandstone.

The Ohio black shale is the lowest stratum exposed in the county. It outcrops along the west bank of the Scioto. In color it is very black, is fine-grained, high in carbon, and crumbles after long exposure. The shale was used by prehistoric man in making gorgets and other ornaments found in the mound.

HISTORICAL DATA

The Tremper mound has been in possession of the Tremper family for many years. The base of the mound never had been disturbed, as the owners were unwilling that the mound should be examined, except under the auspices of the Ohio Archeological and Historical Society, and for the benefit of the state. However, several years ago, Senator Tremper's sons, Richard and William Tremper, made a superficial examination by digging into the top of the mound at several points, finding a number of skeletons buried not more than one foot below the surface. These burials doubtless were of an intrusive nature, as was shown by the finding of five additional and entirely similar burials in the exploration of the mound, but which differ greatly in both mortuary customs and artifacts from the real builders of the mound.

The first published account of the Tremper mound is found in *Ancient Monuments of the Mississippi Valley*, by Squier and Davis, 1846, page 83, with a drawing of the mound, shown as plate 29, after the survey by Charles Whittlesey. The work is designated as an "Ancient Work and Animal Effigy, Scioto County, Ohio."

EXPLORATION OF THE MOUND

On July 21, 1915, was begun the exploration of the Tremper mound. The examination had as its purpose the exposing to view of the entire site of the mound, the recording of all finds, and the photographing of all important features.

The surveyor of the party, Mr George H. Miehl, made a complete survey of the mound and the earthwork that surrounds it before excavation was begun, and from his notes prepared the topographic map shown in figure 1. He then established secondary traverse points upon and around the mound, and from these located, by the aid of the instrument, the various finds in the mound as they were unearthed, and from his notes prepared the map. Figure 2 shows the plan of the floor of the mound. Mr Miehl also prepared a plan showing a cross-section of the mound, on which were recorded the

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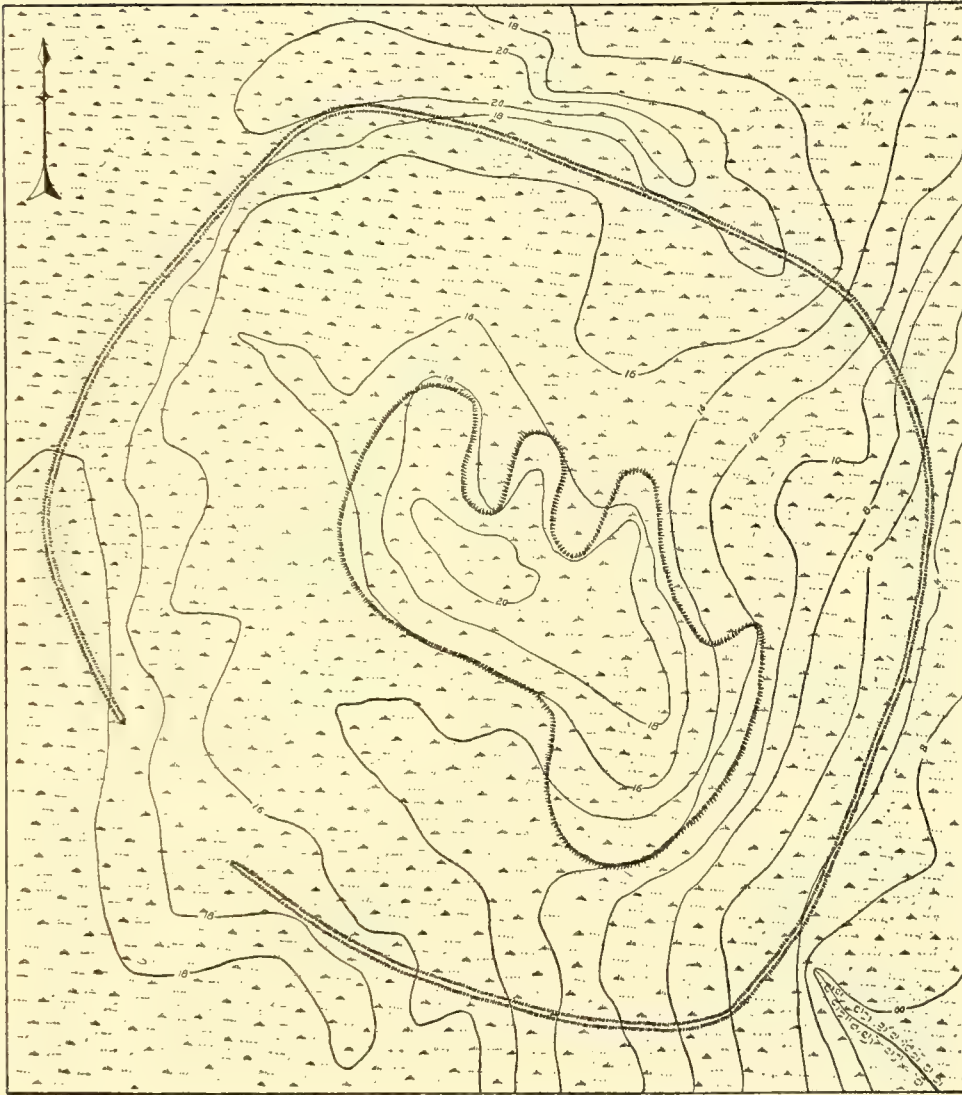


FIG. 1.—Topographic map of the Tremper mound. (Scale 90 feet to the inch)

depths of finds therein, as well as the depth of the soil composing the mound and of graves found below its base.

The maximum length of the mound as shown by our survey is 250 feet and the maximum height is 150 feet, with an average width of 120 feet. Its maximum height is $8\frac{1}{2}$ feet, with an average height of about 5 feet. The solid contents of the mound are approximately

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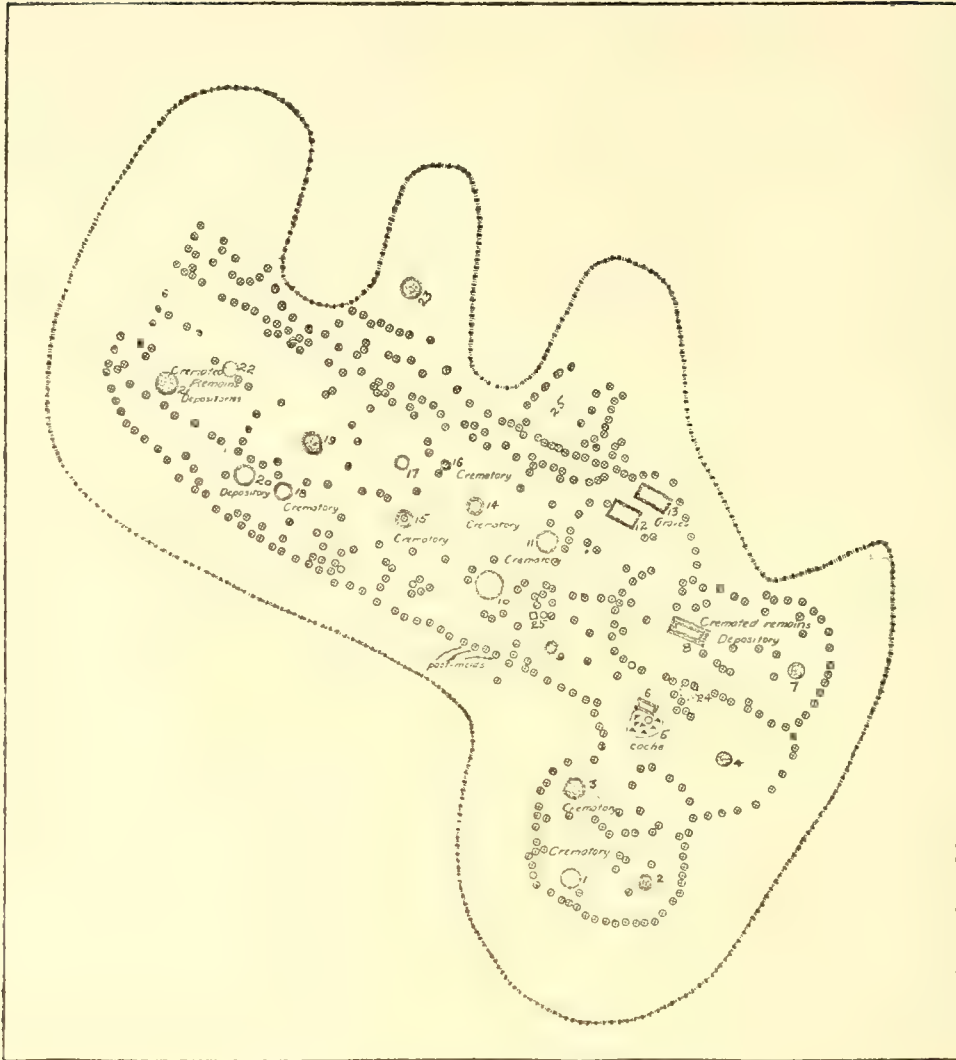


FIG. 2.—Plan of the floor of the Tremper mound

3000 cubic yards of earth, all of which was examined, after which the mound was restored to its original height and dimensions.

The surface of the mound had long been under cultivation and was devoid of trees or undergrowth, which greatly facilitated its examination.

For the greater part it was constructed of surface soil secured in

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close proximity to the mound site, and within the encircling earth-work. Squier and Davis state that the mound is composed of loose broken sandstone and earth; however, we found but few pieces of sandstone, these occurring only in connection with intrusive burials. Within the body of the mound, now and then small pockets of gravel were unearthed, while the central portion of the floor, surrounding the large communal grave and the cache of artifacts, was covered with fine sand to a depth of several inches.

The remarkably distinct floor, which in every part of the mound was readily distinguishable from the earth composing the mound itself, greatly facilitated the locating of the rows of postmolds marking the outline of the structure, as well as of the various rooms and apartments thereof.

Approximately six hundred of these postmolds were noted. Many of them were clean cavities extending both below and above the floor-line, this condition being found where the posts had not been entirely consumed in the burning of the structure, leaving them gradually to decay, their places being marked only by the hollow mold. In other instances, the proof of the burning of the structure when its purpose had been served, and preparatory to the erection of the mound, was seen in the partly burned and charred posts. These were present both in the molds at the floor-line and also where they had fallen during the conflagration, and had been covered before they were consumed. Specimens of the charred sections of posts were taken out intact and placed on display in the Museum.

SITE OF THE MOUND A SACRED PLACE

The work of exploration soon disclosed that the Tremper mound is of the great Hopewell culture, but, with the possible exception of Mound No. 8, Mound City group, differing in several important particulars from mounds of that culture already explored. These differences, which presented themselves as the work of excavation progressed, were the depositing of the ashes from the crematories in communal depositories, the burial of cremated remains beneath the base-line of the mound, and the placing of the artifacts of the dead in common caches. In this last respect, Mound No. 8, Mound City group, was analogous, and it is probable that the communal idea extended also to the disposition of the cremated remains, although this, as well as interment of cremated remains below the base-line, cannot at present be determined, as the explorations of Squier and Davis in that mound were of so desultory a character as to preclude any very definite or extended information. Therefore, insofar

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as actual information goes, the communal character of burial and the sub-base interment of cremated remains are features exclusively of the Tremper mound.

As is to be expected in mounds of the Hopewell culture, it was found that the site of the Tremper mound had been occupied by a structure serving as a sacred place, in which the dead were cremated, their ashes deposited in prepared receptacles, and the doubtless intricate ceremonies accompanying these proceedings, including the depositing of implements of the deceased, were carried out. The structure proper had been a large oval inclosure, approximately two hundred feet long and half as wide. A number of chapel-like additions, possibly to afford more space or to supplement that of the main structure, had been built from time to time. Upright posts averaging six inches in diameter, set into the ground to a depth of about two and one-half feet, formed the outer walls of the complex structure, as well as the partitions separating them into various compartments. The remains of a kind of wattlework woven of twigs and limbs were found, which doubtless had been used to close the interstices between the upright posts, which were set about three feet apart. The floor of the area comprising the sacred structure had been carefully leveled and smoothed, and in places fine sand had been spread over it. Doubtless parts of the structure at least had been provided with some kind of roof or thatch, as indicated by the arrangement of certain of the posts, but no direct evidence of the existence of such a roof was found.

Reference to the plan of the floor of the Tremper mound (fig. 2) explains the arrangement of the structure into rooms or compartments. The postmolds indicate the outline of the entire building and of the additions, as well as various partitions and supports. The most important of the additions to the main structure, it will be noted, were on the east and southeast, with others in the nature of passageways and inclosures, with openings leading to the interior principally along the northern side. There appear to have been several openings at the extreme western end. It was the covering over with earth of these secondary additions, in constructing the mound, which gave it the anomalous shape suggesting the erroneous idea of an intentional animal effigy.

SPECIAL FUNCTIONS OF THE COMPARTMENTS

The great room comprising the central and western portion of the structure, and particularly the southern side thereof, was devoted entirely to the care of the dead. Here the greater number of the

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crematories were situated, as well as several small depositories. Of the three large circular additions built onto the eastern end of the structure, the most southerly, 45 by 50 feet in size, contained three large crematories and apparently was given over entirely to the purpose of cremation. The floor of this room was covered to a depth of about an inch with charred leaves and straw. The room directly north, being the central one of the three additions at the eastern end of the main structure, appears to have been given over entirely to the great cache of pipes and associated artifacts, described elsewhere. It contained, however, in addition to the cache, a rectangular prepared basin or depository, unused, a cremated burial of a single individual, and a large fireplace. In this room, the floor of which had been covered with sand, no posts had been placed interiorly. This provided a large space around the fireplace, entirely clear from obstruction, a condition not noted in any other part of the structure. The room just north of the one containing the cache held a very large prepared depository for the ashes of the dead, and a large fireplace. This room doubtless was the main vault, in which the greater part of the cremated remains of the entire structure was deposited. The smaller additions along the northern side appear to have been mainly in the nature of long passageways and small rooms. The floors of these, in great part, were covered with charred leaves, cloth, and other substances, strewn in places to a depth of several inches. The most definitely outlined of these rooms along the northern side is that shown as number 25 in figure 2. This room appears to have been a veritable workshop and kitchen, the floor being strewn with the bones of animals, such as the deer, elk, bear, turkey, and raccoon. None of these bones had been worked, but all were broken, indicating the use of the animals as food. Broken pottery, apparently associated with the preparation and containing of food, was also abundant on this floor, as was Ohio black shale, in pieces of a size suggesting their use in the making of ornaments. Practically the entire floor of this room was covered with mica flakes, in size from the smallest bits to fragments an inch or more in diameter, many of them apparently refuse from the large crystals of mica found in the great cache. Southeastward from this room, and adjacent thereto, was a room below the floor of which were found the two graves containing cremated burials and described elsewhere.

Study of the map of the floor-plan and of the data pertaining to the mound enables one to picture rather vividly the activities, carried on doubtless through a considerable length of time, of the builders in disposing of their dead.

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CREMATION OF THE DEAD

Cremation was an exclusive practice with the builders of the Tremper mound, not a single instance of uncremated burial being recorded. The uncremated burials found near the top of the mound, and described elsewhere, were of an intrusive nature, and did not pertain to the culture responsible for the building of the mound.

The crematories were identical with those found in the Harness and Seip mounds, and others of the same culture explored. They were twelve in number and were scattered generally through the structure. All showed evidence of long-continued use, and in most of them the presence of charred human remains was noted. They were most in evidence in the large room, at the south center of the structure, which seems to have been especially set apart for this purpose. The crematories were basin-shaped, many of them quite deep. The earth beneath them was burned red for a depth of almost a foot.

Disposal of Cremated Remains.—The placing of the ashes of the dead in prepared communal depositories was the rule with the builders of the mound. The exceptions were two cremated burials below the floor of the mound, and two individual cremated burials. The communal depositories, peculiar to the Tremper mound, were four in number, consisting of a main depository in the eastern end of the structure, and three smaller ones in the western end. These communal graves correspond in use, and to some extent in form, to the prepared graves of the Harness, Seip, and other mounds of this culture explored, with the distinction that they served to contain not a single burial or one consisting of the remains of a few individuals, as in the Seip mound, but an unlimited number of burials.

This depository, numbered 8, figure 2, and pictured as plate I, was made of fine puddled clay, which after being worked into place was burned. The clay was applied with the hands, imprints of fingers being visible, as were also marks of the digging-stick used in tamping down and shaping the sides of the basin. The depository was in the form of a parallelogram, 10 feet 3 inches long and 5 feet wide, with a central depth of 6 inches. The bottom measured 6 feet 6 inches long by 13 inches wide, its surface being perfectly flat and level. The grave was filled with human ashes and charred bone to a depth of a little more than one foot; these ashes, however, were very compact and originally must have been piled high above the rim of the basin. The contents of the depository no doubt represent the remains of hundreds of cremated bodies, indicating the use of the grave for a long period of time. The floor surrounding the great basin was



THE LARGE DEPOSITORY FOR THE CREMATED DEAD

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covered on the southern and western sides with fine yellow sand, and on the eastern and northern sides with bits of charcoal and ashes mixed with clay.

The three small depositories, shown as 20, 21, and 22, figure 2, were not specialized as was the large one, but were merely prepared bases of clay. The ashes of the dead were piled upon these flat bases to a depth of two and one-half inches on No. 20, two inches on No. 21, and three inches on No. 22. A specialized depository (No. 6 in figure 2) was found near the great cache, but it contained no cremated remains and apparently never was used. In form it was very similar to the large grave, and measured 5 feet 3 inches in length and 2 feet 5 inches in width, outside measurements.

A comparison of the mortuary customs of the Tremper mound builders with those of the Harness and Seip mounds shows the great advantage of the communal plan of the former. In the use of individual prepared graves, as in the Harness mound, or in the Seip mound where the graves occasionally were enlarged so as to hold as many as four cremated bodies, the available space soon would be exhausted, while under the communal plan the number of cremations that could be placed in one depository was limited only by its size. Additional depositories, moreover, could easily be constructed, making the Tremper mound plan of burial much superior.

Estimated Number of Cremations.—There is no way of ascertaining exactly the number of dead contained in the four depositories of the Tremper mound. The bulk of ashes and charred bones was computed at twenty-five cubic feet, which, allowing one-fifteenth of a cubic foot to each burial, would represent the cremation of three hundred and seventy-five individuals. No doubt this is far short of the total number of dead cremated, as the floor of the charnelhouse was strewn with ashes and fragments of charred human bones.

An individual cremated burial was found in the room containing the great cache, and is shown as No. 24 in figure 2. This burial appears to have been of considerable importance, as it was placed in the angle formed by the joining of two walls, and a row of small posts placed around it. A second individual cremated burial was found in this room, about two and one-half feet above the floor. With the charred remains was a flint spearpoint, six inches long. A feature peculiar to the Tremper mound was the finding of cremated burials beneath the floor. These are shown as 12 and 13 in figure 2. The two graves were three and one-half feet deep, the floors being the surface of the undisturbed sandstone strata underlying the site. Their dimensions were 7 feet long and 3 feet wide, and 7 feet long

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and 5 feet wide respectively. The first grave, No. 12, contained only a small amount of ashes and charred remains, and no artifacts of any kind. The second grave contained, besides the cremated remains, four copper ear-ornaments, mica cut into the form of crescents, a mica effigy of the bear, and a small flint spearpoint.

PRIMITIVE MASONRY

A special feature of this grave was a wall of thin slabs of sandstone at the sides and ends of the grave, completely lining it, and resulting in a vault-like receptacle with perpendicular walls. So far as recorded this is the only instance of a regularly laid-up wall of stone constructed by aboriginal man in Ohio. The wall was $2\frac{1}{2}$ feet high, built of flat pieces of sandstone, ranging from 1 inch to 3 inches in thickness, and in length from 4 to 12 inches.

FIREPLACES

What might easily have been confused with the crematories of the mound were two fireplaces, situated one in each of the more northerly of the tier of rooms at the eastern end of the mound, and shown in figure 2 as 4 and 7. That shown as 4 was situated in the room where the great cache was found, and was surrounded by a considerable space of level floor, unencumbered by interior posts. The fireplace was three feet in diameter, and in the form of a basin, four inches in depth, the earth being burned red for one foot below its bottom. The basin contained no remains of human bones, but instead charcoal and ashes in great quantities. The fireplace shown as 7 in figure 2, situated in the room with the great depository, was fully four feet in diameter, circular in form, with a basin-like depression at the center, four and one-half inches deep. It was filled with charcoal and the earth beneath was burned red for fully one foot in depth. This fireplace showed evidences of having been mended by plastering the sides of the basin with puddled clay.

The prominence of the location of these two fireplaces with respect to the communal deposits of ashes and artifacts suggests that they might have been dedicated to the sacred fire, which plays so important a part in the ceremonial observances of primitive peoples.¹ From the great depth to which the earth beneath them is burned, it would appear that they were in use for a long time; while the amount of charcoal contained therein would indicate that they were burning at the time the construction of the mound was commenced.

¹ The Cherokee believed that a perpetual sacred fire burned beneath the mounds.

MILLS—THE TREMPER MOUND

INTRUSIVE BURIALS

As is not infrequent in mounds of any culture, the Tremper mound was found to contain intrusive burials. These were placed near the top of the mound uncremated, and were of a culture entirely different from that of its builders.

Previous to the exploration of the mound, the sons of Dr Tremper had, in occasionally digging into its top, unearthed perhaps ten of these intrusive burials. Our examination disclosed five additional skeletons. Two of the burials were so near the surface that cultivation had disturbed them. The graves of these burials were all prepared by placing slabs of sandstone on edge around the sides and ends, and by using similar slabs as covering.

CACHE OF ARTIFACTS

The communal disposal of the ashes of the dead, as carried out in the Tremper mound, naturally would be accompanied by a similar disposal of the artifacts usually associated with burials. The logical expectation, perhaps, would be to find them deposited along with the ashes in the common receptacle: that is, simply substituting for graves containing individual burials and artifacts, a common grave wherein the ashes and artifacts of an unlimited number of individuals would be placed. Instead of this, however, it was found that separate depositories were provided.

The great cache of tobacco-pipes and associated objects found by Squier and Davis in 1847, in Mound No. 8, Mound City group, Ross county, has been the wonder of archeological research in Ohio until the present time. Few archeologists expected that this great find ever would be equaled, the cache being considered as unique and alone in its class.

Owing to the superficial character of the Squier and Davis explorations at that place, the Mound City tumulus and its remarkable contents have been only indifferently understood; now, however, the examination of the Tremper mound not only throws the desired light on the character of the Ross county mound, by duplicating its known features, but even goes so far as to surpass it greatly in point of artifacts found, as to both number and artistic execution.

The results of the exploration of the Tremper mound, aside from their bearing on any phase of Ohio archeology, are exceedingly gratifying; but when they serve further to elucidate the exact nature and purpose of the only mound altogether similar, so far explored, the results are in effect two-fold.

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Two distinct caches of artifacts were found in the Tremper mound: one, the principal depository for the ornaments and implements of the dead, being very extensive and apparently having served along with the great depository for ashes through a considerable period of time, and the other, evidently deposited all at one time during the construction of the mound. The first, or larger, of these caches was situated in the central one of the three large rooms at the eastern end of the structure, and is shown as 5 in figure 2. It occupied a space of about six feet in diameter along the southern side of the unused depository, shown as 6, the objects comprising it being placed in a heap, of which a large stone disc formed the center. All objects in this cache had been intentionally broken, the supposition being that this was done to avert the likelihood of their being stolen from the great open deposit. The cache of artifacts, like the cumulation of ashes in the communal grave, was a product of time, doubtless a number of years elapsing between the time it was begun and the final destruction of the building. Despite the natural respect of primitive man for the property of the dead, the beautiful objects placed in the cache would prove a great temptation to the derelict or to the stranger who might gain access thereto; so that, to render them undesirable, each object was deliberately broken, and the fragments then deposited in the cache. In this respect, as in all others recorded, the Mound City tumulus, Mound No. 8, was similar.

The second cache of artifacts was found near the center of the mound, two and one-half feet above the floor-line. This secondary cache, so far as known peculiar to the Tremper mound, differed from the large cache in that the objects composing it were unbroken and in perfect condition. This is readily understood, when the position of the cache in the mound is considered. Being within the mound proper, and well above the floor, it clearly had been made after the burning of the structure and during the erection of the mound, the objects being deposited simultaneously and at once covered over, thus averting danger of theft.

Contents of the Caches.—The features of the large cache was the tobacco-pipes, one hundred and thirty-six in number. These pipes were of the so-called platform type, a number of them being carved in the effigy of birds and animals, and the remainder plain. Besides the pipes, there were in this cache, among other things, beads, gorgets, and boat-shaped objects of copper; crystals of mica and galenite; ear-ornaments of stone; cones cut from quartz crystals and galena; ornaments made from jaws of animals and of man; flint-cutting implements; mealing stones, woven fabrics; and the large stone disc

MILLS—THE TREMPER MOUND

already mentioned. In addition to the objects enumerated, there were present in the cache many others made from wood and bone, mostly badly decomposed or burned. A total of more than five hundred specimens had been placed in this cache.

The smaller of the two caches contained nine tobacco-pipes, representing the platform type, the tubular, and the modified tubular types. Among those of the platform type were several extremely large and fine pipes, made from Ohio red pipestone, the largest and finest ever found in an Ohio mound. The tubular forms likewise are particularly large and fine. In addition to the pipes, this cache contained a pair of the rare type of ear-ornaments, made from Ohio red pipestone, and a pierced slate tablet.

ART DEVELOPMENT

The sculptural art displayed in the pipes taken from the Tremper mound represents the highest esthetic attainment of the Hopewell culture, and probably never has been surpassed by any people in the stone-age period of its existence. The technique displayed in the portrayal of life-forms is no less admirable than the apparent faculty of the artist for observing and appreciating the habits and peculiar characteristics of the birds and animals with which he was familiar. Among the animal and bird forms depicted in the sculptures, the following have been identified: bear, mountain lion, wildcat, raccoon, porcupine, opossum, beaver, otter, dog, rabbit, mink, deer, fox, wolf, squirrel, and the owl, hawk, wild duck, eagle, heron, crane, kingfisher, crow, quail, paroquet, bluejay, and song sparrow. In the pipes of the plain type, the graceful forms of both bases and bowls, and the bilateral symmetry of the specimens, are such as to attract attention and compel admiration.

THE MOUND CITY CACHE

In 1846 Squier and Davis found a cache in Mound No. 8, Mound City group, which they describe as follows:

Intermixed with much ashes, were found not far from two hundred pipes¹ carved in stone, many pearl and shell beads, numerous discs, tubes, etc., of copper, and a number of other ornaments of copper, covered with silver, etc. The pipes were much broken up, some of them calcined by the heat, which had been sufficiently strong to melt copper, masses of which were found fused together in the center of the basin. A large number have nevertheless been restored, at the expense of much labor and no small amount of patience.

¹ The collection gathered by Squier and Davis was purchased by Mr Blackmore for his museum at Salisbury, England. The number of pipes obtained in Mound No. 8 as recorded in the Museum's printed catalogue known as "Flint Chips", is only 95.

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I never have had the pleasure of seeing the collection of pipes taken from Mound No. 8 and now in the Blackmore Museum at Salisbury, England. However, from the illustrations and descriptions of the broken specimens in *Ancient Monuments of the Mississippi Valley* and in the catalogue of Blackmore Museum, I am satisfied that the breaking was not due to fire, but that they were broken intentionally when placed in the cache, exactly as were the pipes in the Tremper mound. Stone broken by heat has a different appearance from stone broken by a blow from a heavy instrument; as to the copper being melted, I am satisfied that Squier and Davis confused the adhesion of copper pieces, due to oxidation, with what they mistook for fusion by fire, which they state was "sufficiently strong to melt copper." This condition of copper pieces firmly adhering through corrosion, was found in the Tremper mound, associated with the pipes. The same condition was noticeable in the Harness and Seip mounds, and is found in practically all mounds where a number of copper pieces are placed together. In the Harness mound numbers of ear-ornaments were united through corrosion, suggesting their fusion by fire; but on the contrary, the charred remains of the cremated dead placed over them, had protected the ear-ornaments from contact with fire kindled at the final ceremony. The Seip mound gave many more examples of the fusing of copper pieces by corrosion. In one instance large copper plates were so united that they could not be separated; in another a copper plate could not be detached from a crescent of copper partly covering it. And yet none of these specimens had been subjected to the action of fire.

BUILT BY THE SAME PEOPLE

The data offered by Squier and Davis as a result of their explorations of the Mound City group are not sufficient to make available for comparison the manner in which the objects were deposited in the cache, but the similarity of the sculptured pipes from two mounds, and the stone from which they were carved, seems to be proof conclusive that they were made by peoples having the same mortuary customs and were placed in the cache in the same way. For instance, the heron eating a fish, found by Squier and Davis, is almost an exact duplicate of one from the Tremper mound, as is also the otter with a fish in its mouth, although this specimen was mistaken by Squier and Davis for the manatee, a water animal of Florida. In fact all the animal sculptures from the Mound City group, with the exception of the elk, were duplicated in the Tremper mound, and in

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addition the following sculptures were found: gray fox, porcupine, dog, deer, rabbit, and mink.

While the art shown in the Tremper mound pipes in general is superior to the Mound City specimens, both as to sculpture of the various animal and bird forms, and in their fidelity to nature, the technique in both instances is strikingly similar.

The Tremper mound site is not so large as the Mound City group site, but the protecting earthwork surrounding it is similar. The unfortunate lack of detailed information concerning the mounds in the Mound City group, explored by Squier and Davis, makes impossible a comparison of the method of disposal of the dead by the Tremper and Mound City peoples.

Squier and Davis state that the great cache in Mound No. 8 was placed upon a sacrificial altar "intermixed with much ashes," and from their statement that "the pipes were much broken—some of them calcined by heat, which had been sufficiently strong to melt copper," we must infer that they believed that a great fire had been kindled upon the altar. The same conditions obtained in the Tremper mound, and while we have proof that the building covering the site was destroyed by fire, I am sure that no fire was especially kindled upon the cache itself. Although objects made of bone, wood, and cloth were found in a charred state, the fire was not sufficient to melt the crystals of lead found in the cache, nor in any way to injure the broken pipes or stone gorgets.

Taking everything into consideration, it would not be surprising to find that the Mound City peoples, after erecting their mounds, migrated down the Scioto and formed a new settlement on the site of Tremper mound. At any rate, if not the same people or parts of the same people, the builders of the two mounds must have been very closely related.

THE TOBACCO-PIPES

One hundred and forty-five pipes were taken from the Tremper mound, one hundred and thirty-six of them being found in the large cache and nine in the small one. All pipes in the first cache were intentionally broken as deposited, while those placed in the second cache were in perfect condition, having been deposited simultaneously while the mound was in process of erection.

Careful scrutiny was required to find the broken parts of all pipes and other objects,¹ the fragments being scattered through a great

¹ My assistant, Mr H. C. Shetrone, for the greater part removed the contents of the cache. Much credit is due him for his careful work in securing the broken parts and afterward in restoring the pipes.

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mass of charred material, débris, and earth covering the cache, parts of specimens often being several feet distant from one another. One hundred and six of the one hundred and thirty-six pipes secured were fully restored. The remaining thirty, made of very soft materials, were weathered and decomposed beyond repair. More than half of these thirty fragmentary pipes had been broken while in use and mended with copper by the owners. About twenty of the thirty are effigies of birds of various kinds, the other ten being effigies of the otter and beaver, and of the plain curved platform type. Of the one hundred and six pipes restored, sixty are effigies and the remainder plain, the latter made with more or less expanded bowls and curved bases. All of the one hundred and six are made of the Ohio pipestone native to the region adjacent to the mound, with the exception of one (a large effigy pipe), of coral limestone. In almost every instance the pipes found by Squier and Davis were made of this pipestone, although they did not recognize the stone as a native product but stated that the pipes were "mostly composed of red porphyritic stone, somewhat resembling the pipestone of the Coteau des Prairies, excepting that it is of great hardness and interspersed with small, variously colored granules." At the time of the exploration by Squier and Davis (1846) but little was known of the geological formations in the state, so that they may be excused for not recognizing the rock from which the pipes were made, although its native bed is only a short distance from the mound.

Otter Effigy Pipes.—Pipes made in the image of the otter (*Lutra canadensis*) taken from the mound are eight in number. In five of these the animal is represented with a fish in its mouth. Two of the sculptures are full-length (pl. II, 1), while three of them represent only the head and shoulders. The three remaining show the plain head and shoulders. The early sculptors must have been greatly impressed with the otter, as they were able to portray with remarkable fidelity to nature the appearance and habits of the animal.

To those who have studied the habits of the otter it is readily apparent that the ancient sculptor in depicting this animal produced a masterpiece full of spirit and action. Comparison of the sculpture of the otter taken from the mound and a colored plate of the same animal shown in Cuvier's *Mammalia* (vol. II, pl. 135), with the animal itself, readily shows how true to nature the ancient artisan did his work and how erroneously the earlier modern artists sometimes portray their subjects.

The sculptured pipe of the otter shown in plate II, 1, is made of yellowish-brown Ohio pipestone; the platform $4\frac{1}{2}$ inches long,



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1¼ inch wide at each end, and 1¾ inch wide in the center, with a prominent curve from front to back. The platform is a quarter of an inch in thickness, cut square at the front or stem end, where the stem-hole leads to the bowl, the back end forming a highly graceful curve. The bowl of the pipe extends vertically through the body of the otter, which is carved at full length with a large and well-formed fish in its mouth. The sculptor has displayed much skill in portraying such features of the animal as the bowed back, large flat head, short ears, and compressed tail, all of which are characteristic of the otter.

Effigy of the Raccoon.—Plate II, 4, is a splendid sculpture of the raccoon, represented at full length with its left foot in a crayfish hole, a habit peculiar to this animal. This well-carved pipe shows that the sculptor, doubtless a close observer of the raccoon, was really able to reproduce in stone for all time a faithful representation of this animal and its habits as seen by aboriginal man. It shows the general posture the raccoon assumes as it leisurely searches the crayfish hole for food, and that there may be no doubt as to what the animal is doing, the pellets of mud incident to its construction are distinctly carved out on the extension of the crayfish hole. The expression of cunning is exemplified in the general make-up of the entire effigy. The pipe is 3½ inches long and the platform 1 inch wide at each end; the stem-end is square, while the opposite end terminates in a graceful curve. The head-markings are pronounced, and the eyes are set with copper. In its entirety this pipe is the masterpiece of Indian raccoon sculptures.

Gray Wolf Effigy Pipes.—The sculpture of the gray wolf is shown in plate II, 5. The primitive artist again has displayed his skill by depicting the attitude the wolf assumes in viewing the habitation of the Indian when well out of range of weapons. The pipe is made of Ohio gray pipestone, somewhat discolored with splotches of brown. The platform, curved, measures 1¼ inch wide, 3½ inches long, and square at both ends. The wolf figure, portrayed in a sitting posture, is more than 2½ inches high; the head and ears are intently thrown forward and the tail lies on the platform. In point of spiritedness the sculpture is perhaps unsurpassed in the collection of pipes.

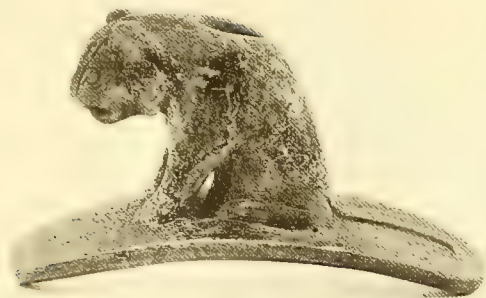
Effigy of the Gray Fox.—The gray-fox pipe shown in plate II, 3, is a splendid sculpture of this animal. The pipe is made of Ohio blue-gray pipestone and is highly polished. The platform has a very slight curve; it is 4 inches in length and 1 inch wide at the stem end, which is square. The platform widens from the front to the center, where its width exceeds an inch and a half, and gradually tapers toward the rear, forming a gracefully rounded end. The image of the

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fox rises from about the center of the platform and represents the animal as seated, with head and body thrown forward and front feet touching the platform. The head has the characteristic markings of the gray fox, and the ears are thrown forward as if the animal were intently viewing some object. The primitive artist certainly has portrayed the general form and features of the animal, as well as its characteristic attitude and expression. The sculpture of the gray fox (*Urocyon virginianus*) has never before been reported, but its presence in Ohio during prehistoric times is evidenced by the finding of numerous bones of the animal at the Baum village-site along Paint creek. Here the remains of the fox were perhaps as numerous as the bones of any animal excepting the deer. At the Gartner village-site along the Scioto, bones of the fox were found in large numbers.

Effigy of the Indian Dog.—The only representation of the dog coming from an Ohio mound that could rightly be indentified as such is shown in plate II, 2. The primitive artist knew his subject well and was able to reproduce in stone the general form and features as well as the characteristic attitude and expression of the dog "baying at the moon." No other sculpture from the mounds is more pleasing, and none tells so much of natural history as this sculpture of the only domesticated animal of primitive man in Ohio. The pipe is made of Ohio blue-gray pipestone and is well fashioned. The platform, which is decidedly curved from end to end, is $2\frac{3}{4}$ inches long and $1\frac{1}{8}$ inch wide at the stem-end, gradually narrowing from the center to the rear, where the top of the platform is concave, and ending in an oval. The bowl rises from the center of the platform and represents the dog in a sitting posture, its tail curled over the back and the head thrown high as in the attitude of barking. While, so far as we know, plate II, 2, shows the only authentic sculpture of the dog taken from an Ohio mound, the bones of the animal have been found, both at the Baum village-site and at the Gartner village-site. At the Baum site bones of the dog were found in every part of the village and its presence as a domesticated animal is shown by the gnawed ends of bones found in practically every refuse pit. At the Gartner mound and village the bones of the dog were in evidence and instances of the gnawing of bones were abundant.

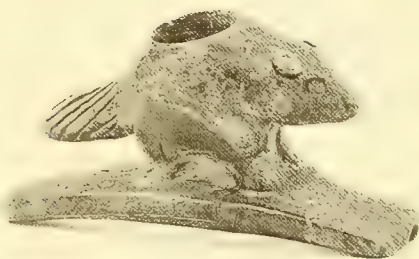
Effigy of the Black Bear.—The sculpture of the black bear (*Ursus americanus*) shown in plate III, 5, is perhaps the finest of the three bear-pipes found. This pipe is made of Ohio dark-blue pipestone and is carved with much spirit and fidelity to nature. The platform is $3\frac{1}{2}$ inches long, flat on top and convex beneath; it is 1 inch wide at the stem-end, and carries this width almost to the opposite end,



1



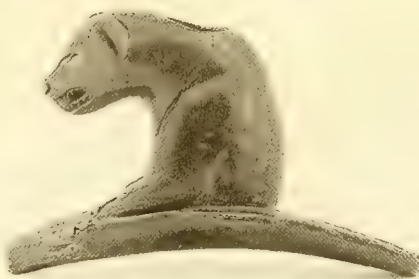
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5

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where it narrows to three-fourths of an inch, forming a symmetrically rounded end. The stem, directly in front of the great paws of the bear, was broken while in use by the owner and very ingeniously mended by boring holes in each piece, inserting dowel pins, and then placing around the stem a band of copper to hold the parts together. The eyes are set with pearls, and the carving represents the animal with the mouth partly open, showing the teeth, of which the canines are especially emphasized.

Mountain-lion Effigy Pipes.—Plate III, 1, illustrates a pipe made in the image of the mountain lion, carved with much spirit and fidelity to nature, showing that the sculptor was a close observer of this animal. The lion is in a sitting position, with the tail carved in relief on the rear of the finely curved platform, the body thrown forward, the short stout head at a poise suggesting contentment after partaking of a heavy repast, and the mouth partly open as in the act of grooming itself. The characteristic eye-markings are plainly shown. Taken as a whole this pipe is the finest of the three sculptures of the mountain lion. The specimen is of Ohio light-gray pipestone, strongly discolored by brown splotches of iron. The platform has a gradual curve from end to end, and is 4 inches long and $1\frac{1}{4}$ inch wide at the stem end.

Wildcat Effigy Pipes.—The sculptures of the wildcat (*Lynx rufa*) found show plainly the work of a master hand. The pipe shown in plate III, 2, is made of Ohio dark-blue pipestone. The stem, but slightly curved, is 3 inches long, 1 inch wide, and square at each end, with the corners at the rear end rounded. The bowl of the pipe, rising directly from the center of the platform, represents the animal in a sitting posture, with its short tail cut in relief on the platform, its fore-feet on the same plane as the body, and the head thrown forward in the attitude of contentment. The head is stout and short, with the color-markings and whiskers very pronounced, and is somewhat enlarged and out of proportion to the body.

Effigy of the Porcupine.—Plate III, 3, shows the sculpture of the porcupine (*Erethizon dorsatus*). In this pipe the sculptor has fashioned the animal in a characteristic attitude, as seen at home in the woods. The head with short ears, is well sculptured, as is the thick heavy tail, with its spines plainly marked. The pipe is made of red and light-gray mottled pipestone. The stem is well curved, $3\frac{3}{4}$ inches long, $\frac{3}{4}$ of an inch wide, square at the stem-end and oval at the rear end. So far as known, this is the only sculpture of this animal from an Ohio mound. The geographical distribution of the Canadian porcupine in early days was along the Alleghanies, southward through

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Pennsylvania into Virginia, westward to Kentucky, and northward to the limit of trees in Canada; hence it must have been well known to prehistoric man in the Scioto valley. We have found the bones of the porcupine sparingly in the Baum village-site, a lower jaw and several small bones being noted. Now that we have its sculptured effigy and know that the Indian was acquainted with the animal, I am sure a careful search will bring to light more of its bones. However, it must be remembered that the Indian dog was very fond of bones, which may account for the sparsity of those of some of the smaller mammals.

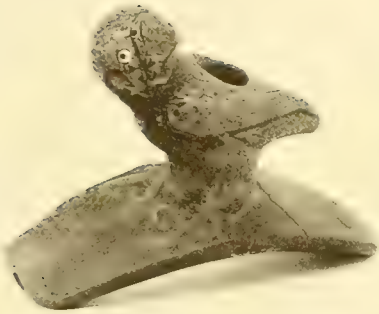
Squirrel Effigy Pipes.—The gray squirrel (*Sciurus carolinensis*) was well known to prehistoric man, and in all the six sculptures found is portrayed in the familiar posture shown in plate III, 4. This effigy is spirited and admirably true to nature, and perhaps is the most artistic of the squirrel sculptures. It is made of light-gray pipestone, strongly marked with red, giving the specimen the appearance of marble. The platform is $3\frac{1}{4}$ inches long, flat on top, convex beneath, and regularly curved from front to back. The squirrel is carved around the bowl in an erect sitting posture, with the front feet held closely to the body, the head in the attitude of watchfulness, and the bushy tail curled up over the back.

Sculpture of the Toad.—Plate IV, 1, shows a splendid conception of the common toad. Many of the prehistoric Indians sculptured the toad and the frog, but the pipes of the Tremper mound and the Mound City group are unique in producing the toad in the platform type of pipe. The pipe shown in plate IV, 1, has a platform $4\frac{1}{2}$ inches long, and 1 inch wide at each end, expanding in the center to $1\frac{1}{2}$ inch. It is strongly curved from front to back, flat on top and convex beneath, to accommodate the large stem-hole. The sculptor's conception of the toad is extremely good so far as general appearance and proportions are concerned, although some features of it might be considered exaggerated and others dwarfed.

Effigy of the Hawk.—The pipe shown in plate IV, 3, is unusually well carved and represents the hawk in the attitude of viewing its surroundings. The object is of gray pipestone, somewhat discolored by salts of iron. The platform is a little more than $3\frac{1}{2}$ inches long, $1\frac{1}{2}$ inch wide, and regularly concave beneath. The feet and talons are well carved and somewhat emphasized. The color-markings on the head are very distinct, and the eyes are set with copper. The feather-markings of the wings and back are carved true to nature. This pipe was found in the second cache, two and one-half feet above the floor of the mound.



1



2



3



4



5

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Sculpture of the Paroquet.—Plate IV, 2, illustrates a very good sculpture of the Carolina paroquet, which no doubt attracted aboriginal man of the Scioto valley, where it formerly was common but is now extinct. The sculpture shown is a fine conception of this beautiful bird. The artist fully portrays its keen eyes by a setting of pearls, and the head and body-markings are well executed. The head is turned upward, as becomes the inquisitive character of the bird. The stem, which is gracefully curved, and the tail, were slightly broken and repaired by the maker. The paroquet was found also by Squier and Davis, in Mound No. 8, Mound City group. These authors state (1846) that the paroquet is sometimes seen fifty miles above the mouth of the Scioto, and we have a very authentic record¹ made by Dr William S. Sullivant in July, 1862, of a boisterous flock of paroquets, numbering twenty-five or thirty, in the elms of the Capitol square at Columbus.

Owl Effigy Pipes.—The barred owl (*Syrnium varium*) shown in plate V, 1, is a faithful representation of the hoot-owl, as this species is popularly known. In this specimen the primitive artist has portrayed the habits and appearance of the owl by sculpturing it as facing to the rear, and emphasizing its eyes by the insertion of large pearls. The feather-markings, especially in wings and tail, are very prominent. The platform, which is unusually large, is $4\frac{1}{2}$ inches long and $1\frac{1}{4}$ inch wide at each end. The front or stem end is squared, while the rear end is oval. The pipe is made of light-gray pipestone slightly stained with iron.

Sculpture of the Great Blue Heron.—The great blue heron shown in plate IV, 5, is one of the finest of the bird sculptures. The bird, with its small body, long wings, neck, and legs, is represented in the act of eating a fish. The artist's work is excellent, both as to conception of the bird and its habits, and in the faithful and delicate execution thereof. As a work of art it is the equal of any of the sculptures taken from the mounds of Ohio. The pipe is made of dark-gray pipestone. The platform is strongly curved from front to back, flat on top and convex beneath, and is square at each end with rounded corners; it is $3\frac{1}{2}$ inches long and $1\frac{1}{4}$ inch wide. This specimen and a similar one found by Squier and Davis in Mound No. 8, Mound City group, and illustrated in their report, are the only ones of the kind found in Ohio mounds. The feather-markings and only the outlines of the wings and tail are shown in the Mound City pipe; the platform is but slightly curved, and like the specimen from the Tremper mound is square at each end. In the catalogue of the Black-

¹ Dawson, The Birds of Ohio, p. 371.

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more Museum a drawing of this specimen shows the platform as straight and the stem end squared, but the rear end is shown as an oval. Bones of the great blue heron consisting of the ends were found sparingly at the Baum village-site.

Sculpture of the Sand-hill Crane.—The only sculpture of the sand-hill crane taken from the mounds of Ohio is shown in plate IV, 4. Like that of the great blue heron, just described, this sculpture forms a class by itself. The artist's conception is well portrayed in the splendid feather-markings of wings and tail, in the long neck and head, and in depicting the habit of the bird in using its strong bill for digging in the earth in search of food. A unique feature of this pipe is the red crest on the head of the bird, painted at the time it was made and retaining its color unfaded. The keen eyes are set with copper, and the entire appearance of the bird is pleasing and true to nature. The specimen is made of dark-gray pipestone. The platform is gracefully curved from front to back and is $3\frac{3}{4}$ inches long, $1\frac{1}{4}$ inch wide, and square at each end.

Skeletal remains of the sand-hill crane were not recorded at the Baum village or at the Gartner village, but a later examination of the cut ends of leg-bones taken from the latter site fully identified the bird as having been present in that village. However, the bones of such birds as the crane and the blue heron were well adapted to use as ornaments and implements, and therefore seldom are found in a perfect state, being usually worked into artifacts.

Plain Platform Pipes.—The plain platform pipes taken from the Tremper mound are very interesting. They were associated with the effigy pipes, and so far as the platform is concerned, are, with the exception of the several specimens made of red pipestone, exactly like them. These latter, while of the platform type, have the bowls much larger and display a greater variation in curve of base, some being practically straight, some slightly curved, and others extremely curved. The small plain platform type resembles the effigy pipes in every way, except that the bowls are usually plain. A representation of the plain pipe is shown in plate V, 2.

SUMMARY

A brief résumé of the explorations of the Tremper mound shows the following prominent features, which, it is believed, add materially to the fund of information concerning the great Hopewell culture of prehistoric inhabitants of Ohio, and which, it is hoped, will prove to be an important chapter in the history of the aboriginal peoples of the Ohio valley.



1



2

PIPES FROM THE TREMPER MOUND

MILLS—THE TREMPER MOUND

The mound marks the site of a sacred structure wherein its builders cremated their dead, deposited the ashes in communal receptacles, made similar disposal of the personal artifacts of the dead, and observed the intricate ceremonies incident to mortuary rites.

The builders of the Tremper mound had reached a cultural stage in which united or communal effort in great part replaced individual endeavor, and in so doing had reached a degree of efficiency probably not equaled by any other people in the stone-age period of its development. This fact is attested most strongly by their customs, in which, by the use of communal depositories for cremated remains and personal artifacts, they effected a plan for the disposal of the dead unhampered by the limitations displayed by the Seip mound and Harness mound plans, the next highest noted in the Ohio mounds. In these latter mounds individual graves soon exhausted the available floor space; while in the Tremper mound plan, burial was limited only by the size of the communal depositories, the number of which, moreover, easily could be increased if needed.

The high development of sculptural art by the builders of the Tremper mound is a striking feature of their versatility. While artistic achievement is not always an index to the culture status of a people, the fact that in this respect they probably surpassed any other strictly stone-age people is significant, and taken together with other pertinent facts, places them very well along toward the upper stage of barbarism, with civilization waiting but a short distance away. The great number of admirably executed carvings of birds, mammals, and other life-forms, taken from the mound, many of which would be worthy the efforts of modern artists, can but excite wonderment and admiration for the primitive artisans of prehistoric Ohio.

The presence of large fireplaces showing evidences of long-continued use and significantly situated with respect to the communal deposits of ashes and artifacts, seems to indicate the use of sacred fires, so important an adjunct of religious observances among early peoples of the Old World. The great depth to which the earth below these fireplaces was affected by the heat suggests that they were kept perpetually burning, while the charred contents of the fireplaces indicate that the fires were extinguished only when the earth composing the mound was heaped over them.

Of scarcely less importance than the exploration of the Tremper mound, *per se*, is the light it sheds on the great Mound City group of northern Ross county. Owing to the methods employed by Squier and Davis in examining the mounds of this group in 1846, their char-

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acter and purpose have remained until now matters of surmise. The method employed by these early explorers was to sink shafts from the tops of the mounds, and from the limited area of a mound and its base thus exposed, to draw conclusions as to its character as a whole. In this way, Mound No. 8 of the group, from which was taken a great cache of pipes and other objects similar to the Tremper mound cache, was described by them as covering a great sacrificial altar on which had been kindled intense fires, resulting in the breaking of the specimens deposited thereon.

The conditions found in Mound No. 8 were exactly duplicated in the Tremper mound, but the complete examination of the latter shows that the conclusions drawn from the partial exploration by Squier and Davis are not warranted; in short, it is strikingly evident that the two mounds in their character and purpose were entirely similar, and that their builders were closely related. So similar indeed are the mounds and their contents that it would not be surprising to find, if not already proved, that the builders of the Mound City group migrated southward through the Scioto valley and constructed the Tremper mound and earthwork. Thus are forged several important links in the chain of evidence as to the existence and career of this most advanced of stone-age peoples. We find them extending from Mound City, where their skill as builders and artists has been the wonder and admiration of archeologists, southward to the Ohio river, where, at the Tremper mound site, they reached the highest point of their development thus far noted.

The story of the struggles of this people, as told by the Tremper mound, is certainly one of the highly interesting chapters in the history of primitive culture. No primitive people has shown such skill and perseverance in wresting from nature the raw materials needed for their purpose, nor such versatility in fashioning these materials into finished products. The most striking phase of this, perhaps, is the manner in which, with only the simplest of tools, the stone for their manufacture was quarried from the hills, and the realistic portrayals of bird and animal life sculptured in full relief and finished in minutest detail, were effected. In the record preserved by the mound we find a vivid picture of the strength and persistence of the forces underlying human development and urging it, against all odds, toward a higher plane.

OHIO STATE ARCHEOLOGICAL AND HISTORICAL SOCIETY
COLUMBUS, OHIO

The Problem of the Red-paint People

By WARREN K. MOOREHEAD



AS I prepare these pages there lies before me a volume written by James P. Howley, Esq., under the title "The Beothucks, or Red Indians, the Aboriginal Inhabitants of Newfoundland"; it was published by the University Press, Cambridge, England, in 1915, and evinces much research on the part of the author. The publication is interesting in the present instance in view of the contention that the so-called Red-paint People are the Beothucks of Newfoundland, Nova Scotia, and adjacent regions. A careful comparison of the objects therein illustrated with those from the graves of the Red-paint People indicates the marked difference between the remains of the real Beothucks and those of the supposed members of that stock.

Shortly after 1880, Dr Augustus C. Hamlin, interested in the geology and natural history of Maine, found in that state numbers of stone tools in deposits of red ochre, and at a meeting of the American Association for the Advancement of Science, Dr Hamlin mentioned his discovery to the late Prof. F. W. Putnam, who, it appears, was impressed by the peculiar character of the burials or deposits; accordingly he dispatched Mr C. C. Willoughby to Bucksport and Ellsworth, Maine, where important explorations were conducted. Mr Willoughby examined three cemeteries or deposits of the so-called Red-paint People, and gathered for the Peabody Museum a comprehensive collection of stone objects, comprising adz-blades, gouges, "plummets", long slate spears, pyrites, rubbing stones, and ornaments.

Some of the long, slender, slate spears, or problematical forms, which constitute one of the eight characteristic or persistent types occurring in these graves, were shown to Professor Putnam by a Mr Woodcock, who had found a number of them in a Red-paint cemetery near the head of Georges river, and by Mr Alfred Johnson, who had obtained others at Ellsworth. At that time such objects were so unusual that their genuineness was questioned, particularly since they were made of soft material. However, Mr Willoughby's investigations, as well as later studies, have proved beyond question the antiquity of the objects.¹

¹ C. C. Willoughby in *Archæological and Ethnological Papers, Peabody Museum*, vol. 1, no 6, 1898.

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From 1892 until 1912 there appears to have been no attempt to investigate Indian remains in Maine, further than the examination of shell-heaps by Amherst College and by Prof. Arlo Bates. In the summer of 1912, Phillips Academy organized an expedition and during the succeeding four years carried on extended researches throughout the state. The following large river valleys and lakes have been examined more or less thoroughly, and some of them in considerable detail: The Penobscot and its tributaries, the St John, both rivers St Croix, Grand lakes, Schoodic lakes, Moosehead lake, Union river, Georges river, about half of the Kennebec, Allegash river, and all of the coast except that portion lying between the mouth of the Georges river and the New Hampshire boundary. It is difficult to estimate correctly the distance traveled upon or along these various waterways, but it is safe to assert that the expeditions traversed a total of more than four thousand miles and conducted excavations in at least a thousand different places.

The Department of American Archæology of Phillips Academy has not published its report on the work conducted in Maine during the last five years, and it is therefore not desirable to present in this paper a summary of all the information obtained. In view of the widespread interest attached to the Red-paint problem, however, it will not be out of place to indicate the trend of the facts procured.

There have been discovered in Maine during the last thirty-five years, eighteen of the so-called Red-paint cemeteries or deposits. Three of these were examined by Mr C. C. Willoughby of the Peabody Museum, six or seven were excavated by citizens of Maine, and the remainder were explored by Phillips Academy. Of this entire number, two examined by Mr Willoughby had not been previously explored or were only slightly disturbed, and three of the nine investigated by Phillips Academy were practically intact. Previous exploration on the part of untrained collectors caused considerable damage to the other cemeteries, and, in three instances, complete destruction.

The aborigines representing the Red-paint culture seem to have selected a sandy or gravelly knoll, or the end of a ridge, or the slope of a glacial kame, in which to place their offerings. Plate I illustrates a cemetery on the Emerson farm at Alamoosook before exploration, and shows the surroundings. All of the eighteen cemeteries, with one exception, are similar; the exception noted is a mound explored by Mr Willoughby on Lake Alamoosook, which, although natural and smaller, was not unlike mounds common in the Ohio valley.



SITE OF THE EMERSON CEMETERY, LAKE ALAMOOSOOK, ORLAND, MAINE

MOOREHEAD—RED-PAINT PEOPLE

With the exception of the Stevens cemetery at Warren, the Red-paint People chose for their interments natural elevations of sand or of fine or fairly coarse gravel, in which digging was easy. The Stevens site, which contained about sixty graves or deposits, was situated on a rather high hill overlooking Georges river. The excavated portion of the cemetery occupied a space about 25 by 18 meters, in which fifty-six graves were found. The Stevens cemetery was different from the others, in that large boulders, ranging from two to three centimeters to as much as two-thirds of a meter in diameter, were scattered through the gravel. The formation was distinctly glacial, and there were layers of sand here and there, but at no point did clear sand or small gravel extend to a depth of more than a few meters. That the Red-paint People should have selected such a site, when there were more favorable ones in the neighborhood, marks a departure from their usual custom.

This exception noted, it is well to consider the seventeen cemeteries which exhibit characteristics in common. The graves lie as close together as is compatible with the proper interment of the bodies. They vary from twenty centimeters to a meter and a half in depth. In rare cases graves were superposed.

The contents of graves are shown in plates II and III. The Emerson cemetery on Lake Alamoosook, is situated about 400 meters from the scene of Mr Willoughby's exploration. The Emerson site was the largest of the entire eighteen, and originally must have contained more than two hundred graves. More than a month was spent in exploration here, the area being trenched for more than one hundred meters in various directions. Seventy-two graves were found within a space of approximately 50 by 40 meters. Years ago the owner, Mr Emerson, plowed deeply to secure specimens, hence practically all the graves lying within thirty centimeters of the surface were destroyed. Our party found the deeper graves undisturbed. Numerous gouges, "plummets", adz-blades, and other objects were scattered through the soil, owing to the disturbance referred to above.

The slope in plate I is situated next to the fringe of timber. At Passadumkeag, 50 kilometers north of Bangor, we found an undisturbed cemetery which afforded a splendid opportunity for study in detail, and it was excavated almost entirely by means of hand trowels. The graves, numbering seventeen, ranged from 30 to 50 cm. in depth, and lay within the restricted area of 15 by 13 meters. The graves were remarkable for their size and richness; that is, the average number of objects per grave was about ten, and one of the graves contained nineteen. Furthermore, the size of the gouges and per-

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forated stones or pendants was unusual, one of them measuring about 40 cm. in length.

The slight differences between these cemeteries are interesting and significant. The area occupied by the Red-paint People has been determined as follows: Its most northerly limit is Passadumkeag, about 115 kilometers from the mouth of the Penobscot; the most easterly cemetery is at Sullivan Falls, near Bar Harbor, approximately 50 kilometers east of the Penobscot; near Katahdin Iron Works, up Pleasant river, a tributary of the Piscataquis, the source of the red paint was found. Mr Walter B. Smith, formerly of the United States Geological Survey, who is familiar with the surface geology of the Penobscot valley, informed me that in his opinion there was no possible source in Maine for powdered hematite except at the Katahdin Iron Works. Mr Smith accompanied the expedition and his opinion was verified.

The outcrop consists of soft, powdered, brilliant carmine hematite, and extends along the side of a high ridge. At Ebemee lake, about 45 kilometers west of the Penobscot, and 8 kilometers from this outcrop, is a Red-paint cemetery of unknown extent, owned by a gentleman living in Milo, Maine, who, it is said, will not permit exploration. Objects from this site have been observed, and they are unquestionably of the same culture as those illustrated in plates II, III, and IV.

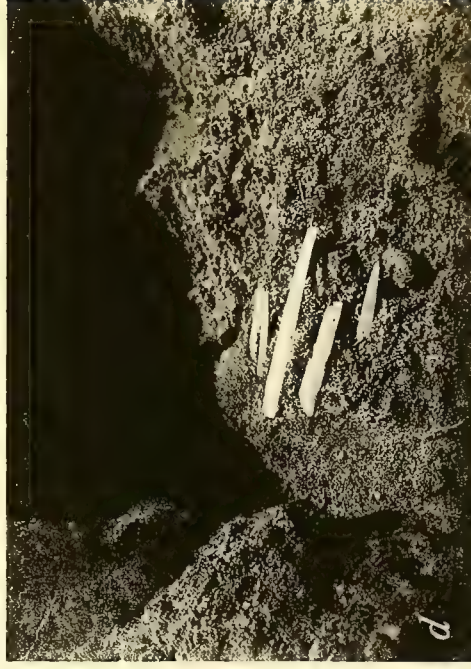
The Red-paint culture has been traced to the Georges valley, about 60 kilometers due west from the mouth of the Penobscot. Roughly estimated, then, the area dominated by the so-called Red-paint People was somewhat more than 110 kilometers in extent. Mr Willoughby informs me that a Red-paint cemetery existed on the banks of Kennebec river, which would carry the culture toward the west some 70 kilometers beyond the Georges valley. The site is now covered by a factory, and exploration is impossible. The lower Penobscot basin seems to have been the seat of the Red-paint culture.

The objects found in these cemeteries, or deposits of offerings, or whatever they may be, fall into eight distinctly non-Algonquian groups or types. In the Peabody Museum of Harvard University there are fully 500; in possession of citizens of Maine, the Maine and Bangor Historical Societies, about 425; in New York and Philadelphia collections, 170; the museum of Phillips Academy, 1410, a total exceeding 2500 specimens of these eight types. I have examined all of these collections and they confirm observations made in the field.

The eight persistently recurring forms are as follows: First, the gouge; this is usually very well made, and sometimes it reaches a



STONE ARTIFACTS IN RED-PAINT GRAVES IN MAINE
a, The contents of a grave *in situ*, Harford Cemetery, Orland.
b, Grave near a large rock, Emerson Cemetery.



OBJECTS IN RED-PAINT GRAVES IN MAINE

MOOREHEAD—RED-PAINT PEOPLE

length of 35 cm.; it may be hollowed its entire length, or tapering, or the depression may be V-shaped. Many of the specimens do not present a gradual deepened groove, but on the contrary it is abrupt, and the depression extends from the edge less than a third the length of the specimen. Double gouges, and gouges highly polished, are not infrequent. Second, the adz-blade, which may be thin and angular—thinner than the celt. There is also the large, heavy, angular adz. Occasionally there is a knob or projection on the back, but never grooves, as in the case of Algonquian adzes. Third, the "plummet", in a variety of forms. In nearly every grave there was a "plummet", and sometimes as many as five or six. Fourth, the long, slender, slate spear, varying from 10 to 32 cm. in length; most of these are so delicate that they do not seem to have been used as offensive weapons or in hunting. Fifth, the clear, translucent spearpoints of a peculiar quartzite, some of which are almost agate-like. Faithful search on and in scores of shell-heaps and ordinary camp-sites failed to produce any of these objects. Sixth, the crescent, small and delicate, and well made. Seventh, the effigy, a rare object, although eight or ten have been found in the various cemeteries; they are rather crudely made, and vary from 4 or 5 to 10 cm. in length. There is a wolf or fox head, a porpoise, a whale, and a duck in the Phillips Academy collection. Eighth, iron pyrites or fire-stones, rubbing stones, small bright-colored pebbles, and, lastly, great quantities of ferric oxide, or red paint, which dominates everything else. Frequently two pecks of it were taken from one grave; in fact, we often discovered a cemetery by its discoloration. Similar conditions are not found in the later Algonquian graves, or, for that matter, in any graves or deposits in the United States. Ochre does occur, and its use is widespread; but ochre in connection with the eight types of objects and materials mentioned is not found elsewhere. The two seem inseparable, and the two dominate beyond question the character of the culture.

The total number of Indian graves examined by Phillips Academy during the last five years in Maine alone is about 310. Of these, 290 were in Red-paint cemeteries, while the others were found in shell-heaps or upon the early historic Indian site at Sandy Point, west bank of the Penobscot, 8 kilometers below Bucksport. All investigations were conducted with the greatest diligence and care.

The net result of the examination of the area mentioned leads me heartily to concur in Mr Willoughby's conclusions. One might go even farther and state that these graves are so old that it is often impossible to trace their outlines. Twenty per cent of the stone

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tools show evidence of disintegration through decay. Whether this is due to contact with oxides is a question to be determined later.

The red paint itself has been carefully analyzed by Prof. James C. Graham, of Phillips Academy, who selected samples from the most distant cemeteries and compared them with powdered hematite from the outcrop of Mt Katahdin. The Katahdin sample showed 74% ferric oxide; the Emerson, 55.4%; Sullivan Falls, 57.43%. The difference of 17½% to 19% is not surprising, as the paint in the graves is more or less mixed with earth, whereas at Katahdin it occurs in a natural state. There is not the slightest indication that the paint came from white traders.

There was no uniformity in the position of the objects in the 290 graves; as many gouges, adz-blades, and "plummets" were directed toward the east as toward the north. With the exception of a minute fragment from the Emerson cemetery, no trace of bone was found in any of the graves, and pottery, grooved axes, celts, ordinary ornaments, bone or shell tools, tubes, and other objects common to Indian graves, were likewise absent. In two of the cemeteries were intrusive burials, not however associated with red paint. Arrowpoints were not frequent, and triangular arrows were absent.

From Passadumkeag southward to Georges river the types of artifacts varied slightly. The Stevens and Tarr cemeteries on the stream mentioned produced smaller objects, and the gouges appeared slightly more Algonquian in form. With one exception large slate spears were absent. It is my belief that if investigations were continued toward the west, the Red-paint culture would be found to merge with the early Algonquian. Contrary to the generally accepted view, there are no Red-paint cemeteries to be found in the great St John valley to the northeastward, as far down as Meductic, nor did our research discover traces of this culture in the St Croix basin in eastern Maine, although there are many favorable gravel knolls throughout the eastern part of the state and in western New Brunswick. That the long slate spear and certain gouge forms occur in New Brunswick and Newfoundland is proved by Mr Howley, who illustrates certainly two and possibly three of our eight characteristic forms; the other five, however, are entirely absent, and Mr Howley does not seem to have found any of his objects in graves associated with red ochre.

Finally, comparing the appearance of these Red-paint cemeteries with those in other states where it has been my good fortune to conduct field work, there is a distinct indication of considerable antiquity in favor of the deposits on the lower Penobscot. The



a



b



c

STONE ARTIFACTS FROM RED-PAINT GRAVES OF MAINE
a. Effigies from near Orland. *b.* "Plummets". *c.* Types of Gouges.

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western and southern cemeteries look recent or fresh: the earth in them seems loose and disturbed, whereas in Maine there is solidity and compactness almost approaching restratification.

If the Red-paint graves in Maine are of Beothuck origin, there has occurred a very marked and unusual modification of art forms in ensuing years, for it is quite clear from the exploration that the Beothuck types of artifacts presented by Mr Howley are not those of the Red-paint People of Maine. It would seem that we have not quite solved the problem, unless the Maine remains are those of a pre-Beothuck people of another culture.

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The Supplementary Series in The Maya Inscriptions

By SYLVANUS GRISWOLD MORLEY



IMMEDIATELY following the Initial Series in Maya texts¹ there occurs a group of glyphs known as the Supplementary Series, which has long withstood all efforts toward its decipherment. Mr. J. T. Goodman seems to have been the first to call attention to the group and to point out its probable chronological significance. Writing in 1897, this eminent authority says:

It is evident enough that its purpose is to fix the position of the date it accompanies [i.e. The Initial Series] relatively to some other method or methods employed by the Maya to compute time.²

And in a later publication³ the same writer expressed the further opinion that these glyphs showed the relation of the regular chronology to one from the foundation of each particular city, that it was in short an *ab urbes conditâ* reckoning, starting from a different date in every city.

In 1901 Mr Charles P. Bowditch suggested the name Supplementary Series for the group and pointed out that the glyphs of which it is composed always stand close to the month sign of the Initial Series terminal date, the meaning of which, he believed, they might "supplement".⁴

Both of these hypotheses are doubtless correct in a general way, though neither attempts a close explanation of the group,⁵ the meaning of which has remained an enigma.⁶

There can no longer be any doubt that the Supplementary Series

¹ As used in the present connection the word "text" is applied only to inscriptions on the monuments or buildings, and not to passages in the codices or illuminated manuscripts.

² Goodman, 1897, p. 118.

³ Goodman, 1905, p. 647.


⁴ Bowditch, 1901, pp. 5, 9, 15, 17, 19, 24; and Bowditch, 1910, p. 244.


⁵ In the light of recent investigations it has become necessary to abandon Mr Goodman's later hypothesis that the Supplementary Series are *ab urbes conditâ* reckonings even though they differ in each city.

⁶ The writer's own connection with the subject dates from 1907, when, at Mr Bowditch's suggestion, he took up the study of the Supplementary Series during a year's post-graduate work at Harvard University. The present conclusions, however, are rather more the result of subsequent investigations which are still in progress.

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presents a lunar count of some kind.¹ Four of the eight glyphs of which a normal Supplementary Series is composed have some variant of the moon-sign as an essential component. Thus, for example, in the first and sixth glyphs, counting from right to left—Glyphs A and E respectively in the present scheme of designation²—the moon-sign

itself  is the principal element; and in the fourth and fifth glyphs (C and D respectively) the well-known variant from the

codices  is an equally essential part. Indeed the frequent juxtaposition of one or the other of these two variants with the sign for

the sun, both on the monuments as well as in the codices, clearly establishes their identity as moon glyphs, and in a broader sense indicates the nature of the Supplementary Series as being some kind of a lunar count. Nor does the case rest on objective similarities only, since, as will appear later, mathematical proof of a most convincing kind can be advanced to show that at least one glyph of the Supplementary Series, and that probably the most important, Glyph A, records the length of a lunar month. Before presenting the mathematical and astronomical phases of the problem, however, it will be necessary to continue the objective examination of the series, and to determine the number and characteristics of the several glyphs of which it is composed.

As already stated, Mr Bowditch was the first to point out the position of the Supplementary Series, namely, its immediate connection with the Initial Series terminal date. An examination of the accompanying plates³ will show that it occupies three different positions, as follows: (1) immediately preceding the Initial Series terminal

¹ The writer first announced this opinion in his "Introduction to the Study of the Maya Hieroglyphs." See Morley, 1915, p. 152 and footnote 1. Arithmetical proof of the hypothesis however has only been forthcoming in the past year.

² This nomenclature is not that originally suggested by the writer, to which a few published references have been made. As the investigation of the series has proceeded however, it has seemed best to adapt a nomenclature more fitted to the peculiar needs of the group. The order of reading is from right to left in both. A list of equivalents follows:

Old		New
A	=	A
C	=	B
	=	X
B	=	C

Old		New
B'	=	D
A'	=	E
G	=	F
F	=	G

³ As each text has been given a different number, 1 to 80 inclusive, it has seemed unnecessary to add the corresponding plate numbers. This considerably abbreviates reference to the several texts.

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date; (2) immediately following the Initial Series terminal date; and (3) standing between the two parts of the Initial Series terminal date. The last position is by far the most common of the three,¹ which of itself would appear to indicate that the Supplementary Series is an integral part of the Initial Series. The close positional connection of the two, the one inclosed within the other, doubtless was intentional, and is to be interpreted as indicating a correspondingly close interdependence of meaning. The other two positions indicate the same idea, only in lesser degree, and since Supplementary Series are never found anywhere else, it is evident that by their position alone the ancient Maya priests intended they should be interpreted with and by the aid of the accompanying Initial Series.

Mr Bowditch finds the Supplementary Series vary from 4 to 9 glyphs in number.² These figures, it should be noted, represent the extremes rather than the average. The writer's own studies have led him to the conclusion that the normal and complete Supplementary Series of the Great Period (approximately 460-600 A.D.) was composed of 8 glyphs, and on this basis the glyphs in the accompanying texts have been arranged.

Each horizontal line of glyphs is a complete Supplementary Series. The accompanying description in each case gives: (1) the number of the text in the present arrangement, an unessential factor added only to facilitate and expedite comparison; (2) the site where the text occurs; (3) the monument upon which it is inscribed; and (4) the date of the accompanying Initial Series in Maya Chronology. In those cases where the Initial Series date does not correspond with the contemporaneous date of the monument, the latter also is given. The marginal letters D and M show the positions of the day and month signs of the Initial Series terminal date in each text.

In the drawings it was necessary to arrange the individual glyphs of each Supplementary Series in such a way that when two or more texts were compared the same glyphs would fall in the same column. This was achieved by a horizontal presentation of each text, regardless of the way it occurs in the original, except that the sequence of the individual glyphs within the series (the only vital point so far as their presentation is concerned) has been scrupulously preserved.³ In

¹ Of the 80 examples in the accompanying plates, 6 fall into the first class above, 11 into the second, and 63 into the third. Thus in more than 78 per cent of the texts under observation the Supplementary Series stand between the two parts of the Initial Series terminal date.


² Bowditch, 1910, p. 244.

³ In one text, No. 34, the last two glyphs, A and B, are apparently reversed in position. Such an abnormality in the light of all the other texts can hardly be other than accidental, and it has been corrected in the accompanying drawing. For the uncorrected sequence, see Maler, 1908, pl. 41, 2, B6 A7.

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some Supplementary Series certain glyphs may be wanting. When such textual lacunæ occur the space (or spaces) is left vacant, and the next glyph in the series is drawn in its proper position regardless of the resulting gap. Thus the several vertical columns show the occurrence or non-occurrence of any given glyph in all the texts figured.

Similarly at certain places interpolated glyphs occur. The most conspicuous example of this kind is at Yaxchilan, where an irregular

glyph  is found standing between the last two glyphs of the series, F and G. (See Nos. 17–26 inclusive.) Since this glyph occurs so rarely, no regular place was left for it, and it has been crowded between the two nearest regular glyphs, F and G.

Where parts of the glyphs are shown in gray, a corresponding loss of detail is indicated, usually caused by weathering, sometimes by breakage. Dotted outlines indicate pieces of the original actually missing.

One other point about the accompanying drawings remains to be noted, namely, the vertical scale of the glyphs. In order to facilitate comparison, these have all been drawn to the same vertical scale (i.e. three-quarters of an inch high) regardless of their actual sizes, care being taken, however, never to disturb the relative proportions of height to width. In most texts some glyphs occupy only half or even a quarter as much space as others, and when these are drawn to the same vertical scale their relative widths are frequently increased beyond that of really larger glyphs in the same text. See No. 7 for an extreme case in point, where Glyph B is actually the smallest glyph in the original. Such changes as these are obviously unessential. They do not alter the meanings of the glyphs thus manipulated, and they have been introduced only to simplify comparison.¹

A glance at any one of the accompanying plates will show that a greater regularity in the glyph sequence results, if we begin at the right with Glyph A and count from right to left, than if we begin at the left with Glyph G and count in the opposite direction. For this reason it has seemed best not only to call Glyph A the first glyph of the series, but also to read the series from right to left. Indeed it is not at all improbable that the ancient Maya themselves may have followed this order of reading.²

¹ Just as we would instantly recognize any familiar word even if every one of its letters were of a different size, thus: MoNTh, dÄy, etc. The two cases are parallel. The size and shape of any Maya glyph always depended upon the space it had to fill, and not in any way upon its meaning.

² An analogous case is that of page 24 of the Dresden Codex, where the increasing multiples of 2920, the Venus-Solar period, are read from right to left and from bottom to top, a direct reversal of the usual practice. Other examples in the same manuscript might be cited.

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GLYPH A

The first glyph of the Supplementary Series (see Glyph A, plates I-X) is probably also the most important, since it declares within itself that we are dealing with a lunar reckoning of some kind. It has two


common forms,¹ a normal form  and a head variant . Both

however have the same essential elements: a large central "eye" in an oval socket, and two or three discs attached to the rim of the latter. These discs are usually surrounded by an outer line, and the inclosure thus made often shows cross-hatching.

In two examples, both from Copan, the central "eye" element becomes the head of a deity (see Nos. 68 and 69) which has been identified by Dr Spinden as God D of the manuscripts.² Dr Schellhas, in his definitive work on the Maya deities in the manuscripts, had already associated this god with the moon, and had pointed out that

the principal element of his name-glyph  is the moon-sign it-

self.³ The association appears sufficiently clear, and it may be accepted that in addition to his other and larger functions as a beneficent sky deity, Lord of Day and Night, God D was also definitely associated with the moon.⁴

There is a third and highly unusual variant  which shows

none of the distinguishing characteristics of the other two. So far as the writer knows, however, this aberrant type occurs only in two or possibly in three texts: Stelæ A and N at Copan, and on the Hieroglyphic Stairway at Naranjo(?). These three variants are regular only in that they occur at the beginning of the Supplementary Series in each case, and each has a coefficient of 9 or 10. They are probably a substantive for the more usual form. (See Glyph A, Nos. 77 and 80.)

The principal element of Glyph A was undoubtedly the character used by the ancient Maya to represent the moon; but in addition to

¹ Practically all Maya glyphs, period, day, and month signs occur in two distinct guises: one a normal form and the other a head variant. Frequently, however, both have the same essential characteristic, as for example in the present case. In other glyphs, however, there appears to be no resemblance whatever between the two forms. This is particularly true of the period glyphs, the two forms of which are for the greater part entirely dissimilar. See Morley, 1915, pp. 24-25, for a discussion of this point.

² Spinden, 1913, pp. 69-76, 92.

³ Schellhas, 1904, p. 22.


⁴ Spinden, *op. cit.*

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this astronomical significance it had a purely numerical meaning as well. Through some chain of associations, at present lost to us, it also stood for the number 20.

Numerous examples of this dual use of the moon-sign, both in the inscriptions and in the manuscripts, might be cited, but a few will suffice for illustrative purposes.

As representing the great luminary of the night, this sign is sometimes placed in apposition to the sun on the top of stelæ, the so-called "divinity sides" of Stelæ 1 and 4 at Yaxchilan being cases in point.¹ It occurs also in a similar close relation with the sun on a pair of lintels at Chicozapote.² An even commoner occurrence is its use in constellation bands with a number of heavenly bodies, as the sun, Venus, and Mars, for example.³

In the Dresden Codex the sun and the moon appear in "day-shields" side by side , hanging from the sky.⁴

These several examples clearly indicate that the principal element of Glyph A is a specific sign for the moon.

Its other use, as a symbol for the number 20, is established by numerous examples in both the Dresden and the Madrid manuscripts, where it is repeatedly used in tonalamatls to represent the numerical value 20.⁵ In these places the accompanying calculations are usually such as to preclude all possibility of doubt as to its value.

In Glyph A of the Supplementary Series the moon-sign seems to have this same numerical value, as the following discussion will show.

An examination of the various examples of Glyph A figured in the accompanying plates will disclose the fact that this glyph never has any other coefficient than 9 or 10. This is an invariable rule.

At first sight, and reasoning from the analogies afforded by the period glyphs of the Initial Series, it would appear as though the number 20 were multiplied sometimes by 9 and sometimes by 10. The resulting quantities 180 and 200, however, have no parallels in astronomical phenomena, and long ago the writer reached the conclusion that this was a blind lead. Indeed the matter rested here until

¹ See Maler, 1903, pls. 69 and 70.

² Ibid., pl. 37.

³ Yaxchilan, Stela 4; Piedras Negras, Stelæ 10 and 11; Palenque, the Palace, House A, and the Temples of the Inscriptions, the Cross, and the Sun.

⁴ These day-shields have sometimes been regarded as eclipse symbols. The writer is more inclined to regard them as representing the idea of a complete day, however, i.e., the twenty-four-hour day, composed of both light and darkness, the basic unit of the Maya chronological system. See Dresden 69b and 74 for examples of this use of the moon-sign.

⁵ For examples of this use, see Dresden 12 a, b, and c; Dresden 15 a and b; and Tro-Cor. 113 d.

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Professor Willson of the Department of Astronomy at Harvard University suggested to him that these two coefficients might be united to the quantity they modified by addition rather than multiplication, giving the numbers 29 and 30 instead of 180 and 200. This proved to be the correct explanation of the glyph, and immediately indicated its true function as that of the sign for a discriminating lunar month now of 29 days and now of 30 days in length.

Objective corroboration of this point was soon forthcoming. The writer had long noticed a marked difference in the position of the coefficient in Glyph A as compared with the positions of the coefficients in all other known glyphs, the period, day, and month signs. In the latter the coefficients invariably occur to the left of, or above the element modified.¹ In Glyph A, on the other hand, the coefficient, with but three exceptions, is as invariably placed to the right of the moon-sign or below it. (See Nos. 54, 55, and 56.) These exceptions, however, are all found on very late monuments, in fact the three latest at Quirigua. They were erected and inscribed at a period when the Maya had a long and rich experience behind them, and there could have been no longer any doubt in the minds of the priests how the coefficient of the moon-sign was to be joined to it, namely by addition, and not by multiplication as the positions of these three coefficients would appear to indicate.

Such rare exceptions are relatively unimportant, and it is evident that by placing the coefficients of Glyph A in what were obviously unusual places for coefficients, i.e., behind or below the glyphs modified, the ancient Maya were calling attention by this departure from the regular practice, to the fact that such coefficients were joined to the glyphs they modify by some process other than the usual one of multiplication. If not multiplication, then addition, the simplest of all mathematical processes, would appear to be indicated, and the resultant sums of 29 and 30—the *sine qua non* of any lunar count not dealing with fractional days—may be accepted as proof of the point.

This use of the moon-sign is paralleled in tonalamatls in the codices. Here, when the exigencies of the count required the record of some number in excess of 19, the moon-sign is used with a coefficient

¹ A single exception to this general rule must be noted. On a very early monument (9.3.13.0.0.), discovered by the writer in May, 1916, Stela 6 at Uaxactun, the glyphs on the left-hand side face to the *right* instead of to the left. These glyphs are the kin, day, and month signs of an Initial Series, and all have their coefficients at the right, i.e. after them. Such a radical departure from an otherwise unvarying rule was due probably to the desire to have the glyphs on *both* sides of the monument face toward its front, which could be accomplished only by having those on the left side face to the right.

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attached to its right, i.e., behind it. In Dresden 5b and 19b, the number 29 is actually thus recorded, a perfect parallel with Glyph A of the Supplementary Series.

Glyph A then may be interpreted as the sign for a discriminating lunar month, discriminating since the exact period of a lunar revolution does not equal an even number of days, i.e., $29.530588 +$ days, and it was therefore necessary to have two kinds of lunar months, one of 29 and the other of 30 days—as actually provided for in Glyph A—in order to express the lunar period in terms of whole days.


Very rarely—in 2 texts out of the 80 under observation—Glyph A is omitted. (See Nos. 7 and 9, from Chichen Itza and Piedras Negras respectively.) In the second example a very unusual case of glyph elision seems to have taken place. The moon-element of Glyph A appears to have been omitted, and its coefficient of 9 or 10, here 9, joined to the right of Glyph C instead. In the Chichen Itza text, on the other hand, there are apparently no mitigating circumstances such as this, and this case at least must stand as exceptional.


GLYPH B

The second glyph of the Supplementary Series (see Glyph B, pls. I-X) is probably of less importance than the first, since it does not appear to have been in use as early as Glyph A. Its first occurrence is at Piedras Negras on Stela 25 (see No. 9), 120 years later than Stela 3 at Tikal (see No. 1), the earliest example of a Supplementary Series yet known; nor is this omission only accidental, since in the next three texts in point of age, Nos. 2, 57, and 58, it is also wanting. The earliest example is a normal form, the head variant not appearing until a little later. See No. 60.



Glyph B is composed of four elements, all of which appear to be of equal importance: (1) An elbow element which always has a pair

of crossed bands at the bend . (2) The head of a small animal,

probably a rodent ; this is the variable element, since in the

normal form of the sign it is replaced by a pair of circles ;

as just pointed out this appears to be the earlier form. (3) An oval

suffix, which sometimes appears as the ear of the rodent's head . (4) An ending prefix or superfix . The rodent's

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head occurs far more frequently than the normal form, which appears only in 12 examples out of the 80 under observation. (See Nos. 7, 9, 15, 28, 29, 34, 36, 59, 62, 63, 68, and 70.) Very rarely other signs replace these elements. In Nos. 61, 64, and 66 the head of God C¹ is clearly substituted, and in Nos. 27, 73, and 77, unknown elements. The ending prefix or superfix (1) above, would seem to indicate the end of some period—but what? The close proximity of Glyph B to Glyph A might suggest that it is a general sign expressing “here ends the lunar count,” or some similar idea. An interesting objective connection between the two glyphs occurs on Stela 11 at Piedras Negras, where, in a constellation band the same rodent whose head appears in Glyph B is seen emerging from Glyph A, the moon-

sign .²

This animal appears as a full figure form in No. 50 (Glyph B) where the mouth and feet clearly indicate that a rodent is intended. Other examples of this animal, although not associated with the moon-sign, occur on Zoömorph P at Quirigua,³ and possibly on the base of Stela 4 at Yaxchilan.⁴ Dr Spinden has suggested that this animal may be the tepizquintli, one of the agouti family of large rodents, common throughout the Maya area. Maya names for this animal might indicate phonetic similarities with the name for the moon, and thus establish a phonetic connection between the two. Dr Spinden believes the association may have been brought about by the fact that the agouti is a nocturnal animal, hence its connection with the moon.

The most important characteristic of Glyph B remains to be noted, namely, that it never has a numerical coefficient. This conspicuous lack probably indicates that it had some very generalized meaning, perhaps that already suggested, which makes its interpretation correspondingly more difficult. However, for the same reason it probably does not vitally affect the meaning of the Supplementary Series, and may therefore be dismissed from present consideration without further notice.

GLYPH X

The third character of the Supplementary Series has been named the variable glyph because, unlike the other positions, no constant

¹ Schellhas (1904, pp. 20-21) points out the possible connection of this god with the north star or with the constellation of Ursa Minor. See Glyph X, p. 376, for further discussion of this point.

² See Maler, 1901, pl. 20, 1.

³ Maudslay, 1889-1902, vol. II, pl. 60, b.

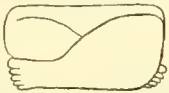
⁴ Spinden, 1915, fig. 171, left side.

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sign is found here. On the contrary, as an examination of the accompanying plates will show, a number of entirely different glyphs occupy this third position, to which the writer has consequently given the general name "Glyph X".

Here indeed is a sign of first importance. The very fact of its wide variation (see Glyph X, pls. I to x) and that it is found in the very earliest texts (see Nos. 1, 9, 57-61) indicates that it must have contributed a vital and distinguishing part to the meaning of every Supplementary Series.

In spite of the variety of the signs occupying this third position, however, certain definite glyphs frequently recur, the commonest being a character which has a pair of crossed legs as its principal

element . This sign alone occurs in eleven texts, or 13

per cent of all those under observation.¹ In six of these cases the subsidiary element is the moon-sign, usually with a pair of flanking

wings ;² and in the other five a grotesque head,³ possibly the death's head .

Another glyph, only slightly less common in this position, is the head of God C which occurs nine times and always with a coefficient of 0, 1, or 3.⁴ The head of the god is held either in the extended jaws of a serpent⁵ or in the same elbow element as the rodent's head in Glyph B.⁶ The coefficient 0 occurs thrice;⁷ 1 is found twice,⁸ and 3 twice.⁹ There are two doubtful head variant coefficients.¹⁰ These two elements are the only ones that recur in the third position with any frequency, although other signs appear more than once, as for example the glyph shown in Nos. 27, 48, and 57.

The only other occurrences of coefficients with Glyph X are in Nos. 53, 54, and 56, all of which are 0.

Unlike Glyph B, the glyphs in the third position of the Supplementary Series doubtless have highly specialized meanings, and they doubtless refer to a group of facts—probably astronomical subjects—which was universally recognized and recorded. Take, for example, such similar signs as Glyphs X in Nos. 27, 48, and 57, just noted,

¹ See Nos. 1, 13, 17, 20, 23, 28, 32, 37, 55, 59, and 60.

² Nos. 1, 13, 32, 37, 59, and 60.

³ Nos. 17, 20, 23, 28, and 55.

⁴ Nos. 8, 14, 16, 26, 47, 49, 50, 66, and 80.

⁵ Nos. 8, 26, 49, 66, and 80.

⁶ Nos. 14, 16, 47, and 50.

⁷ Nos. 49, 66, and 80.

⁸ Nos. 16 and 47.

⁹ Nos. 14 and 50.

¹⁰ Nos. 8 and 26.

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which are found not only at widely separated cities, Palenque, Copan, and Quirigua, but upon monuments dating from different periods. Such close similarity cannot be accidental, but must imply identity in meaning.


The writer believes Glyphs X refer to astronomical phenomena, and probably to definite constellations, stars, or planets, especially prominent in the heavens on the dates declared by the corresponding Initial Series. In this connection it should be noted that Dr Schellhas definitely associates God C with one of the heavenly bodies, probably the pole star,¹ and it is true that the sign for the north is probably the head of this deity. While the Schellhas identification is perhaps based on insufficient evidence, it is not unlikely that God C is to be associated with some constellation, Ursa Major or Ursa Minor, for example, which always revolves in the northern quarter of the heavens as viewed from the Maya region. In other words, it appears possible to identify at least one of the forms of Glyph X quite definitely as a sign for one of the heavenly bodies, which probably indicates the nature of all the other glyphs in the same position.

This fact will probably be found to have a vital bearing on the correlation of Maya and Christian chronology; for as soon as definite relations between the moon and known planets, stars, or constellations have been established in the Supplementary Series, it will be possible to determine the exact hours in Christian chronology when such phenomena took place, and through the accompanying Initial Series it will be possible to correlate the two calendars with a degree of accuracy far exceeding that of any other chronological system of antiquity.

GLYPH C

The fourth glyph of the Supplementary Series (see Glyph C, pls. I-X) is a composite character normally having five elements, though one, the ending prefix or superfix, is frequently wanting. These are: (1) an ending prefix or superfix; (2) a head variant numeral, always in the upper half of the glyph; (3) a variant of the moon-sign with two or three small dots replacing the large "eye" element of Glyph A



always found on the right-hand side of the glyph and frequently attached to the back part of the head in (2); (4) a hand always found in the lower half of the glyph ; and (5) a bar-and-dot coefficient which never rises above 6.

¹ See Schellhas, 1904, p. 20.

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Although interest in Glyph C centers in the two series of numerical coefficients attached to it, the head variant and the bar-and-dot numerals, in order even to approximate the probable significance of these, it is first necessary to examine the other two constant elements, the hand and moon-sign.

The hand throughout the Maya inscriptions has the general significance of "completion" or "ending". Thus it is extensively used in Period Ending Dates to indicate that the period which is recorded nearby with its closing date has come to an end.¹ Thus it is also used in the head variant of the cycle-sign to signify completion. It is interesting to note in this connection that in the Archaic Period the hand as signifying completion appears to have been used with other time periods beside the cycle. For example, on the Leyden Plate which dates from the latter part of Cycle 8 (8.14.3.1.12, approximately 40 A.D.), it is found in the head variant of the katun sign. Another early example is from Stela P at Copan (9.9.10.0.0, about 350 A.D.). These unusual cases are probably due to the fact that at the early time when they were sculptured, the hand had not yet become finally and inseparably associated with the head variant of the cycle-sign, but might still be attached to other head variants to give them the idea of completion. A later example from the Middle Period is found in a tun sign on the southern side of Stela J at Copan (9.13.10.0.0, approximately 430 A.D.).²

Again, in Initial Series it is sometimes used to represent the coefficient 0, the underlying idea being that the period to which it is attached is involved zero times; in other words, the even end of some higher period has been reached and no start made in the next. The analogy to the use of 0 in our own decimal notation is so apparent that further explanation is unnecessary. Zero, completion, end, or close, all had the same connotation to the ancient Maya who recorded their chronology in terms of elapsed time,³ and the symbol conveying this basic idea is undoubtedly the hand. The hand in Glyph C therefore probably indicates that some period has come to its end—but what? The answer would appear to lie near at hand in the variant of the moon-sign always at the right of Glyph C.

This element, as already pointed out, differs slightly from the same element in Glyph A in having two or three small dots instead of one large one. It has already been shown that the moon element in Glyph A stands for the number 20, and with its two coefficients of

¹ Both Mr Bowditch and the writer have described this method of dating in detail. See Bowditch, 1910, pp. 178-190 and pl. XIX; and Morley, 1915, pp. 77-79, 222-245.

² See Bowditch, 1910, pl. XIII—Periods—Face signs, Tun No. 34.

³ See Morley, 1915, pp. 46-47.

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9 or 10, for 29 or 30. The writer wishes to suggest that this slight difference may indicate a corresponding difference in meaning, perhaps, that this variant of the moon-sign may stand for the more general idea of a lunar month regardless of its length, and, with the hand, that a completed lunar month (or months) is in question here.

If these two elements do not declare a completed lunar month, it is probable that they refer to a group of lunar months, though the writer inclines to the former explanation. While the above suggestion should be regarded as little more than a working hypothesis until it has been submitted to a more thorough test, the writer is confident that the true explanation of these elements lies along this line.

Let us next turn to the examination of the two groups of coefficients which modify these elements, and since the bar-and-dot numerals are the more conspicuous of the two, let us begin with them.

As pointed out above, the bar-and-dot coefficient never rises higher than 6; nor does 1, as such, ever occur. Instead there are a number of cases where there is no bar-and-dot coefficient at all. This makes six groups, however, one having no coefficient, perhaps 1, and the others 2, 3, 4, 5, and 6. For the distribution of these among the several Supplementary Series figured, see Table I.

As will appear presently, there are strong grounds for believing that these coefficients indicate the positions of lunar months in some

TABLE I

No coefficient, perhaps 1	2	3	4	5	6
NO.	NO.	NO.	NO.	NO.	NO.
26	8	1	4	2	6
31	14	5	11	3	34
33	16	9	15	7	44
35	18	10	19	12	45
42	27	13	21	20	77
47	39	17	24	22	
57	48	23	28	25	
59	49	32	36	29	
62	54	38	37	43	
66		40	46	51	
67		41	53	58	
75		55	56	71	
80		61	60	73	
		68	72	79	
		69	78		
		76			

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higher lunar period. If so, it is probable that those in the first column, i.e., those having no coefficients, represent the first positions in such periods, that in effect they are coefficients of 1. Algebra affords a parallel case in its coefficient of unity, $1a$ and a representing the same quantity.

In explaining the function of these bar-and-dot coefficients we are not without some aid from the manuscripts. Indeed in a passage from the Dresden Codex presenting a lunar count, we find a close analogy which probably explains why these coefficients never rise above 6. On pages 51–58 of this manuscript there are recorded 405 successive lunations which are arranged in a series of groups, some groups containing 6 lunations and others 5. The individual lunations vary from 29 to 30 days in length and are so cleverly arranged within the groups that at no group ending in the entire period—nearly 33 years—is the cumulative error as much as a day out with the actual number of lunar revolutions.

One striking characteristic of this series at once claims our attention. The number of lunations in a group, and there are sixty-nine groups in all, never rises above 6, precisely the highest bar-and-dot numeral ever appearing in Glyph C. It seems highly improbable that such an unusual coincidence is accidental, particularly in view of the fact that we know, on other grounds, that the Supplementary Series deals with a lunar count. On the contrary it strongly suggests that the bar-and-dot coefficients in Glyph C denote the positions of specific lunations in groups, the units of which never rise above 6, just as in the lunar count of the Dresden Codex.¹

These pages of the Dresden Codex prove clearly that the Maya had the practice of grouping their lunar months of 29 and 30 days each into groups of 5 and 6 lunations each, and if this is true of the Dresden Codex, it would seem as though it should be equally true of the inscriptions, another work of the same priestly class.

Of the sixty-nine groups in the Dresden Codex only nine are composed of five lunar months, all the others having six. In other words a sixth lunar month occurred less often than any of the other five, in the proportion of 60 to 69.² In the bar-and-dot coefficients of Glyph C, 6 occurs less often than any other numeral, it is true, but much less than in the ratio of the Dresden Codex. Perhaps this indicates that groups of six lunar months were of much less frequency in the Supplementary Series than in the lunar series of the Dresden manu-

¹ Dr R. K. Morley, of the Worcester Polytechnic Institute, was the first to note this important coincidence, and to explain the bar-and-dot coefficient of Glyph C on positional grounds.

² That is to say, in nine groups there was no sixth month.

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script. Such points as these yet remain to be determined, and even may be found to have no bearing on the problem; but it is at least interesting to note that the coefficient 6 occurs less often than any of the other five in both the Supplementary Series and the lunar series of the Dresden Codex.

There remain to be described the head variant coefficients in the upper half of the glyph, and the ending prefixes or subfixes. The exact classification of the former is an exceedingly difficult matter, because these numerals are usually small in the originals and suffer the most from erosion. Delicate details are only too often entirely lost and the essential characteristics destroyed. Identification becomes difficult, not to say uncertain, and it is necessary to proceed with caution.

The head variant numeral is occasionally replaced by an element



which the writer believes stands for the zero of the series.

At least no head with the hand for a lower jaw (that is, the head variant for zero) has yet been found in this glyph. Texts showing this element are given in the first column in Table II.

The head variant for 10 appears to be by far the most common. The heads for 6 and 7 each appear once surely—Nos. 22 and 49

TABLE II

0	Human type of head 1, 8, 9, or 12		4	6	7	10
NO.	NO.	NO.	NO.	NO.	NO.	NO.
11	1	34	36	22	35?	12?
26	2	38	46		49	13
29	4	41	58?			14
31	5	42	60?			16?
33	6	43				17
39	7	45				20?
54	8	48				23
77	9	51				28
80	10	53				37?
	18	56				44
	19	57				47
	21	61				50?
	24	71				55
	25	74				62
	27	76				68
	32	78				72
						73?
						79

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respectively. The numeral 4 occurs twice—Nos. 36 and 46. A great number of different heads of the human type¹ have been included in the second column; doubtless some of them are the heads for 1, 8, 9, and possibly even 12. No occurrence of the head for 5 has been noted, although its distinguishing characteristic, the tun head-dress, could hardly have been overlooked if present.

Concerning the meaning of this element the writer hesitates to offer a suggestion. Does it refer to some phase of the moon? Does it indicate the distance of the accompanying Initial Series date from the beginning of the lunar month in which it falls? Or, again, can it express the distance from a definite lunar group in each case, from the starting point of some series of lunar groups? These questions must be left unanswered for the present.

One more element of Glyph C remains to be described, namely, the ending subfix or prefix. Since the Maya themselves omitted this element about two-thirds of the time, we may conclude that it was not entirely essential to the meaning of the glyph. In those cases where it is omitted it probably could have been recorded without changing the meaning of the sign. Both variants of the ending prefix occur: the normal form and the grotesque head.

Glyph C undoubtedly contributes a vital part to the meaning of every Supplementary Series. It is rarely if ever absent, and may be accepted as being as essential to the count as Glyph A. It appears not unlikely that its bar-and-dot coefficient may show the position of the corresponding Glyph A in a group of 5 or 6 lunar months, which we may call 5- or 6-part lunar groups. Finally, for the present, at least, it seems necessary to leave unexplained the function of the head-variant numerals.

GLYPH D

With the fifth glyph of the Supplementary Series the extreme regularity of occurrence as seen in the cases of the first four, breaks down; in fact, Glyph D is found only in about half of the texts. In spite of this irregularity of occurrence, however, it is one of the oldest glyphs of the series, since it appears in the earliest example, No. 1, as well as in other very early texts.² The writer believes its occasional omission may have been due to the fact that it was not essential to the meaning of the count but that it was added in a supplemental way to expand or to carry farther the information

¹ For a discussion of head-variant numerals, see Goodman, 1897, pp. 41-52; Bowditch, 1910, pp. 138-175, and pls. XVI-XVII; and Morley, 1915, pp. 87, 96-104.

² See Nos. 57, 3, 4, and 9.

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already set forth in Glyphs A, B, X, and D, much as we might calculate the position of any day in the year from its month position, July 4, for example, being the 186th day of 1916; December 25 being the 360th day of 1916, etc. The analogy is doubtless not too close, but it indicates in a general way the probable nature of the facts presented not only in Glyph D but also in Glyph E, that is, data directly calculable from Glyphs A, B, X, and C.




Maya computations may be likened to double-entry bookkeeping, where there is a double check on the calculations. Thus it is with Initial Series, where the record of the terminal dates are superfluous, since they can be calculated from the accompanying numbers in each case; and thus we may find it will turn out in the case of the Supplementary Series; at least it seems not improbable that the material sometimes present as Glyph D, and more rarely as Glyph E, is derivable by calculation from Glyphs A, B, X, and C.

Glyph D is composed of four elements: (1) the hand, as in Glyph C; (2) the moon-sign, the same variant as in Glyph C; (3) a numerical coefficient ranging from 1¹ to 19; and (4) a subfixial element, probably of little or no importance so far as the meaning of the glyph is concerned.²

The first two elements undoubtedly are the same as the corresponding two in Glyph C; and whatever may be their meaning in the one glyph, it must necessarily be the same in the other. But we have already seen that in Glyph C there are strong reasons for believing they represent a lunar month. Therefore they probably stand for the same idea in Glyph D.

The difficulty with such an identification is in accounting for the bar-and-dot coefficients, which rise as high as 19. Perhaps these might denote the position of the lunar month in a series longer than the groups of five or six lunations, possibly the position from a definite starting point, different for each city. Again the hands and moon element may stand for a group of lunar months instead of one, in

¹ Strictly speaking, there is no coefficient of 1, but instead there are a number of cases where the sign occurs by itself, without any coefficient, as in the case of Glyph C. As already pointed out in connection with Glyph C, the writer believes such cases are to be regarded as having the coefficient unity after the practice in algebra.

² There are many such subfixial elements in the Maya writing, the day-signs have a trinal subfix , the tun signs another , and the uinal signs another . This latter is the subfixial element most commonly used in Glyph D. Artistic considerations always weighed heavily in Maya glyph delineation, and the necessity of completely filling each glyph-block with sculptured details seems to have been universally felt. Therefore, when the essential elements were insufficient to do this, purely decorative elements were introduced. These may and doubtless did originally have some significance, but their significance in later times probably became so unimportant that they could be and were introduced into a number of different signs without changing their corresponding meanings.

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which event the coefficients 1-19 would probably indicate the position of such a group in a longer series.¹

The distribution of the coefficients of Glyph D is shown in Table III.

TABLE III

No coefficient, probably 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
NO. 6	NO. 8	NO. 9	NO. 11	NO. 5		NO. 41?	NO. 3			NO. 4	NO. 71			NO. 35		NO. 1	NO. 75	NO. 34
12	56?	53	36	43			13											
15		63	44	68			50											
20			66	79			76											
32																		
33																		
37																		
39																		
49																		
51																		
57																		
65																		
73																		
74																		

These coefficients show no striking maxima except in the first column, i.e., those cases where the sign occurs by itself, but regarded by the writer as equivalent to a coefficient of unity. No reason for such a heavy predominance is apparent, nor in fact for the absence of the coefficients 6, 9, 10, 13, 14, and 16. In these latter cases, however, additional texts will probably be found showing such numbers with this glyph.

Except at Palenque, and then only in text No. 28, whenever Glyph E is recorded as well as Glyph D, no other sign ever stands between them; and since no case has been observed of a sign standing between Glyphs C and D, it seems probable that all three of these characters, C, D, and E, stand in very close relation to each other and are to be interpreted together.

¹ It is interesting to note in this connection that the bar-and-dot coefficients of Glyph D never rise above 19, which in itself is in keeping with the Maya vigesimal system of numeration as expressed everywhere else in the inscriptions. The coefficient 20 never occurs, since 20 units of all orders except the second (i.e., the uinals, which take but 18 to make 1 of the period next higher) were written as 1 of the order next higher. Thus if the latter hypothesis were correct, 20 lunar groups would have been written as 1 of the lunar period next higher.

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GLYPH E

The sixth glyph of the Supplementary Series occurs less frequently than the fifth, appearing only in about a third of the texts under observation (see Table VII). It is the last, moreover, of a normal Supplementary Series (i.e., A, B, X, C, D, E, F, and G) ever to have a coefficient.

It is composed of but two essential elements: (1) the moon-sign, same variant as in Glyph A; and (2) a bar-and-dot coefficient ranging from 1 to 19 inclusive, the distribution of which is shown in Table IV.

TABLE IV

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
NO.	NO.	NO.	NO.	NO.	NO.	NO.				NO.	NO.	NO.	NO.	NO.		NO.	NO.	NO.
39	2?	16	6	7	18	14				22	24	21	23	15?		17?	33?	12
	73	26	46	15	28	19?					25							
	74	51			49	37												
		65																

There are several indications that we are again dealing with the same kind of a moon variant as in Glyph A. To begin with, the moon-sign in Glyph E always has the large "eye" element, as in A, instead of the three small dots as in C and D. This objective difference, which has already been pointed out, indicates in itself a corresponding difference in meaning between the two pairs of glyphs and affords a slight clue as to the meaning of E.

The moon-sign in Glyph A, it will be remembered, stands for the number 20; it therefore seems probable that the same character in E has the same value. But here the analogy breaks down, since in A the coefficient is always attached to the right of the glyph or below, while in E it always appears to the left or above. This difference, as already pointed out in connection with Glyph A, probably indicates a difference in the process by which the coefficient affects the main element, in the one case by addition and in the other by multiplication.


The inference appears reasonable, therefore, that the coefficients of Glyph E are joined to the moon-sign by multiplication, and the coefficients in Table IV, therefore, are to be multiplied by 20. And since the unit of Glyph A is the kin, it is probable, on the ground of general similarity, that the kin is also the basic unit of Glyph E. This latter point is strongly corroborated by the Supplementary Series


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from Yaxchilan, which, for some unknown reason, all have this glyph.¹ See Nos. 17–26.

In every one of these texts, just to the left of Glyph E there occurs a character which, so far as the writer is aware, is found only in two other texts in the entire Maya inscriptions, namely, Stela A at Copan and the Temple of the Initial Series at Holactun. See Nos. 77 and 8 respectively.

This glyph is composed of a large oval central element, to which are attached a pair of squatting human legs and a pair of bent human

arms . The central element appears to give the clue to its meaning. It is identical with a rather unusual variant of the kin or

day-sign , which, however, is perfectly familiar and of mathe-

matically demonstrable meaning. Mr Bowditch gives four examples, three from Copan and one from Palenque;² and the writer notes another very beautiful one in a Secondary Series on Slab 6 of the Hieroglyphic Stairway at Naranjo.³ All these have the same characteristics—large scroll at the top of the oval, a line concentric with the base toward the bottom of the oval, and sometimes a pair of vertical connecting lines.

In the glyphs from the Yaxchilan Supplementary Series these same characteristics show very clearly (see Nos. 17, 19, 22, and 23), and their absence in the others is doubtless due to erosion rather than to omission. The basic idea of the two glyphs is identical. Both doubtless represent the kin or day. This is a highly important point, since it probably indicates that this glyph and Glyph E are to be added together after the manner of the different time periods in a Secondary Series.

Returning to this “legged” kin sign it will be seen in Nos. 17–26 that it also has a bar-and-dot coefficient. In No. 17 this is 5 joined to a death’s head; in No. 18 it is 9; in No. 19 probably 6; in No. 20 it is 5 joined to an unknown element, seen, however, in the death’s head of No. 17, and possibly a substantive for the death’s head here; in

¹ No. 20 shows a possible exception to this statement. This text, however, has never been photographed, and the only drawing extant, one by Mr Maler (see Maler, 1903, fig. 43), is known to be faulty in several other important details, the glyph to the left of Glyph D being one of these. The writer has little doubt that this glyph in the original is a perfectly clear representation of Glyph E, and as such it has been treated here.

² See Bowditch, 1910, pl. xiv—Periods, Normal Kin, 6–10.

³ See Maler, 1908, pl. 27.

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No. 21 it is 6; in No. 22 it is 5 joined to the death's head; in No. 23, probably 2; in Nos. 24 and 25, 6; and in No. 26 the coefficient is effaced.

Let us examine more closely the coefficients in Nos. 17, 20, and 22. In Nos. 17 and 22 the bar-and-dot numeral 5 is joined to the head variant numeral for 10, and in No. 20 the 5 is joined to an element which is probably a substantive for the death's head in No. 17, that is, a substantive for 10. These fives can hardly be multiplied by the tens to which they are attached, since that would give 50, an impossible value for Maya coefficients. It seems highly probable, therefore, that they are to be added to the accompanying tens, giving 15 in each case. These ten glyphs may therefore be interpreted as shown in Table V.

TABLE V

No. 17 = 15 kins	No. 20 = 15 kins?	No. 24 = 6 kins
" 18 = 9 "	" 21 = 6 "	" 25 = 6 "
" 19 = 6 "	" 22 = 15 "	" 26 = ? "
	" 23 = 2 "	

But we have seen that Glyph E itself may in every case be reduced to a number of kins, and adding these to the kins recorded by the "legged" kin-sign in the Yaxchilan texts, we have the totals of days recorded by these two glyphs as shown in Table VI.

TABLE VI

"Legged" kin Glyph	Glyph E	Total Kins
No. 17 15 kins	17 × 20 = 340 kins	355 kins
" 18 9 "	6 × 20 = 120 "	129 "
" 19 6 "	7 × 20 = 120 "	126 "
" 20 15 "	15 × 20 = 300 "	315 "
" 21 6 "	13 × 20 = 260 "	266 "
" 22 15 "	11 × 20 = 220 "	235 "
" 23 2 "	14 × 20 = 280 "	282 "
" 24 6 "	12 × 20 = 240 "	246 "
" 25 6 "	12 × 20 = 240 "	246 "
" 26 ? "	3 × 20 = 60 "	6? "

In these cases the total of kins or days does not rise above the year, but elsewhere, in No. 12 for example, it reaches 380 days. The theoretical maximum of the count should be 399, that is, one short of 400, which would be recorded as 1 of the unit next higher.

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If this interpretation of Glyph E should prove to be correct, it would appear to indicate that the Maya recognized in addition to their regular numerical count, the third term of which was 360, another, the third term of which was 400. The discussion of this point would carry us too far afield to be presented here, but the possibility of another and purely vigesimal system of numeration should not be neglected by Maya students.

Beyond the fact that Glyph E, and at Yaxchilan an associated glyph, as it were, record a number of days, it appears unwise to press interpretation farther at this time. It is possible, however, that Glyph E may indicate the position of the Initial Series day in some lunar group, or possibly the distance of the Initial Series day from some particular lunar phenomenon like an eclipse. The fact that it records a definite number of days in each case considerably restricts the field of its possible relation to the other glyphs of the Supplementary Series.

GLYPH F

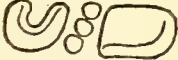
With Glyph F we probably come back again to a sign of important general meaning like Glyph B, important because it is found in about 75 per cent of all the texts under observation (see Table VII).

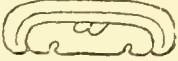
TABLE VII


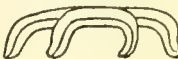
Glyph A occurs in 97 per cent of the texts under observation

"	C	"	"	97	"	"	"	"	"	"	"
"	X	"	"	93	"	"	"	"	"	"	"
"	B	"	"	80	"	"	"	"	"	"	"
"	F	"	"	72	"	"	"	"	"	"	"
"	D	"	"	50	"	"	"	"	"	"	"
"	G	"	"	35	"	"	"	"	"	"	"
"	E	"	"	30	"	"	"	"	"	"	"

It does not occur on the two earliest known Supplementary Series, Nos. 1 and 2, but it appears very early at Copan (see No. 57) and in Katun 8 at Piedras Negras (see No. 9). It occurs both as a normal form and as a head variant, the former outnumbering the latter almost two to one. There is one element, however, the superfix, usually com-

mon to both , though even this is occasionally wanting (see Nos. 46, 47, and 50). In addition to this superfix the normal form is composed of two other elements: (1) a subfix of very constant

character ; (2) a main central element, usually a knot

, and more rarely a winged oval . In the

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head variants these elements are replaced by heads, some of which are normal and others grotesque. A rough classification has been attempted in Table VIII.

TABLE VIII

Normal Forms				Head Variants		
Knotted Central Element		Winged Central Element		Grotesque Heads		Human Heads
NO.	NO.	NO.	NO.	NO.	NO.	NO.
5	31	3	53	19	50	18
7	33	4	57	20	51	55
9	37	10	59	21	80	65
11	38	13	61	22		68
12	42	25	62	44		71
15	52	27		45		72
17	73	29		46		74
24	79	35		47		77
28		36		48		78
30		39		49		
		41				
		43				

The most important characteristic of the glyph is a negative one, namely, its lack of a numerical coefficient. This would appear to indicate that its meaning was very generalized, though what, it is difficult to conjecture. The writer has thought that it might have the general function of announcing or introducing a lunar count, as we shall see that the next glyph, G, may declare that the kin or day count is concluded. Whatever its meaning may be, it is improbable that it vitally affects the meaning of the Supplementary Series as a whole, and like Glyph B its further study may be left for the future.

GLYPH G

Glyph G, the last of the Supplementary Series, is again a sign of generalized meaning. In spite of the fact that it is found in the earliest Supplementary Series known, No. 1, it can hardly be regarded as a regular glyph, since it occurs in little more than a third of the texts under observation. See Table VII.

Its single essential element is the kin-sign, which usually appears as the head-dress of a human head of old aspect. The nose is decidedly Roman, and lines around the mouth make it evident that we are here dealing with a person of years. For examples, see the first columns in Table IX.

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TABLE IX

Kin-sign as Head-dress of an Old Man		Kin-sign without a Head
NO.	NO.	NO.
1	49	3
8	50	6
10	51	15
16	54	22
31	55	37
44	57	52
45	59	53
47	74	75
48		80

This variant is about twice as common as that where the kin-sign appears without a head of any kind. (See the third column above.) A not infrequent characteristic is a superfix composed of three shells



The true character of this superfix appears clearly in Nos. 6, 15, and 48, but the details have been lost in Nos. 1, 49, 51, and 52.¹

That Glyph G is hardly more than a sign for the kin or day appears very clearly in Nos. 8 and 55. Indeed the former is practically identical with the usual head variant for this period, having the kin element in the head, and as an ear-ornament also, a frontlet, large bulging eye and square irid, filed front tooth and wing element.

This would appear to indicate that in Glyph G we are dealing with a generalized sign for the day.² It will be noted that it usually occurs just after the day of the Initial Series terminal date, and possibly may mean "this is the count of the days" or something similar. In that case Glyph F might mean "this (next) is the count of the moons." These two glyphs indeed may epitomize the whole meaning of the Initial and Supplementary Series as diurnal and lunar counts respectively.

MISCELLANEOUS GLYPHS

Toward the end of the Supplementary Series, as already remarked, the regularity of the glyph sequence breaks down. This irregularity, however, is confined to two places, one just before Glyph F counting from right to left, i.e., between Glyphs F and E, and the other just


¹ Care should be taken not to mistake this shell-like superfix for the bar-and-dot numeral 3.

² In a beautiful example of Glyph G from the Hieroglyphic Stairway at Naranjo, not figured in the accompanying plates, the right half of the kin element of this glyph is cross-hatched, while the left half is plain. This might be an attempt to indicate night and day, i.e., the 24-hour day, the true unit of the Maya calendar.

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after Glyph F, the position sometimes occupied by Glyph G, i.e., between Glyph F and the day of the Initial Series terminal date.

A glyph standing in the former position has already been described, i.e., the "legged" variant of the kin-sign at Yaxchilan. Another glyph occurring regularly in this same position in the Palenque texts is a peculiar type of grotesque head, usually found on

end . In No. 27 it has a coefficient of 15; in No. 28 no coeffi-

cient; in No. 29, 10; in No. 30, no coefficient, and in No. 31, 5?. In four of the Yaxchilan texts, Nos. 19, 20, 21, and 22, the same head occurs as the central element in Glyph F, and it occurs also in other places outside of the Supplementary Series. Its meaning is unknown. It will be noted at Palenque that the coefficients present, 5, 10, and 15, are just the quarters of a period in a vigesimal system of numeration.

Other unfamiliar glyphs occur in this same position, some with and some without coefficients. See Nos. 5, 8, 12, 31, 45, 47, 48, 54, 59, 61, 63, 64, 69, 72, 77, and 80.

In the other position mentioned above, i.e., just after Glyph F and in a sense replacing Glyph G, there is a certain group of signs which shows at least one common element—the coefficient 9: Nos. 9, 11, 18, 71, and 72. And in all of these excepting No. 18 the hand element appears. In No. 11 the hand grasps a stick; in Nos. 9, 71, and 72, a head. In the last two cases the head is that of God C. This glyph, i.e., the head of God C grasped by a hand and modified by a coefficient of 9, occurs in several places on the Hieroglyphic Stairway at Copan. The coefficient 7 is attached to another sign three times at widely separated cities, Ixkun, Naranjo, and Copan (see Nos. 5, 33, and 77). The coefficient 5 appears once, No. 12. The recurrence of these two numbers, 7 and 9, attached to definite signs again suggests a highly specialized meaning for them. Such glyphs as these, however, occurring in but a few texts are obviously the "third-line trenches" of the Supplementary Series, not to be taken until the second line of defense has been carried and our positions consolidated for the final assault.

From the foregoing analysis it is evident that the Supplementary Series records a lunar reckoning of some kind, since no fewer than six of its eight regularly occurring glyphs at one time or another show the moon symbol or an equivalent: Glyphs A, B, X, C, D, and E. But what is the nature of this lunar count, what the meaning of so many lunar symbols?

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Although final answer to this question must necessarily await the complete decipherment of the series, it is already possible to forecast with some little assurance the probable nature of the count. The Supplementary Series probably fix the accompanying Initial Series dates in a lunar calendar, which differed in each city.

They appear to declare the kind of lunar month, i.e., whether of 29 or 30 days in length, in which the accompanying Initial Series dates fall (Glyph A); and they probably fix these current lunar months in a lunar calendar composed of a series of groups, containing 5 or 6 lunations each (Glyphs C, D, and E). Other astronomical phenomena actually or ceremonially important on the accompanying Initial Series dates may also be recorded (Glyph X).

The underlying purpose of the series would appear to have been the attempt to arrange a series of 29- and 30-day lunar months in such a way as to keep the resultant lunar calendar as close as possible to the actual time of the lunar revolutions. As already pointed out, pp. 51-58 of the Dresden Codex achieve this difficult feat for a period of more than 32 years without the cumulative error reaching a whole day at any point in the entire series of 405 lunations.

It is obvious that a straight alternating sequence of 29- and 30-day months will run ahead of the actual lunar revolutions at a rate of .03 of a day every lunation. This is due to the fact that the period of a lunar revolution is .03+ of a day in excess of 29½ days, i.e., 29.530588, and the cumulative error in such an arrangement would exceed a day in less than three years.

We may feel perfectly confident, even if we did not have the direct evidence of the Dresden Codex to the contrary, that the old Maya astronomer priests never fell into such a capital blunder as this. They doubtless recognized very early in their cultural history that it was necessary to interpolate an extra 30-day month every once in a while in order to keep their lunar calendar in harmony with the true lunar revolutions; and that such interpolations of 30-day months were actually made is amply proved by the passage in the Dresden Codex already cited. Of the 405 lunar months there recorded, 214 are composed of 30 days each, and 191 of 29 days each; and the total number of days in the entire period falls less than a day behind 405 lunations:

$$\begin{array}{rcl}
 214 \times 30 & = & 6420 \text{ days.} \\
 191 \times 29 & = & 5539 \text{ days.} \\
 405 \text{ lunar} & & \\
 \text{months} & = & 11959 \text{ days.}
 \end{array}
 \quad
 \begin{array}{rcl}
 405 \times 29.53059 & - & = 11959.8889 - \\
 405 \text{ lunations} & & = 11959.89 \text{ days.}
 \end{array}$$

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This predominance of 30-day months over 29-day months, actually found in the Lunar Series of the Dresden Codex, also appears in the Supplementary Series.

Of the 80 texts under observation, 44 have the coefficient 10 in Glyph A, i.e., 30 days; and 31 the coefficient 9, i.e., 29 days, 5 being indeterminate. These are approximately the same percentages in both cases.

Supplementary Series	Dresden Codex
30-day months = .586+	30-day months = .528+
29-day months = .413+	29-day months = .471+

The distribution of these 29- and 30-day months in the Supplementary Series available for study is important, since it probably shows at what points in their chronological system these extra 30-day months were interpolated.




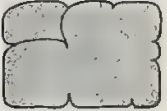



As pointed out by the writer in a paper presented to the Nineteenth International Congress of Americanists,¹ the hotun, or 1800-day period, appears to have been the most important chronological unit in the Old Empire. Indeed this period seems even to have determined the times at which the monuments were erected, since the great majority of all Maya stelæ, probably exceeding 90 per cent, show hotun endings as their contemporaneous dates.²

In Table X the occurrences of the 29- and 30-day months in the different Supplementary Series are arranged in two groups according to the kind of dates recorded by their accompanying Initial Series, i.e., whether they are hotun endings or not.








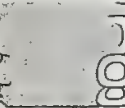





















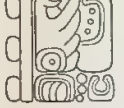











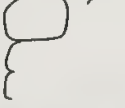


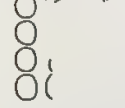
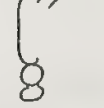









The most important outstanding fact in the table referred to is, that whereas the percentages of 29- and 30-day months in the first group are about equal (27 per cent of the former as against 25 per cent of the latter), the percentages in the second group reveal a far different condition, namely, more than a two-to-one predominance of the 30-day months over the 29-day months. In other words, hotun

¹ See Morley, 1916.











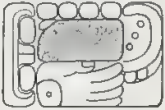






























² Many Maya inscriptions commence with early dates which are brought forward by Secondary Series to later closing dates, which probably indicate the date of erection or formal dedication in each case. It is these closing dates which show this overwhelming proportion of hotun endings. We observe a similar custom in the inscriptions upon our own monuments; these usually give not only the date of the event commemorated by the monument, say July 4, 1776, for example, but also the date on which the monument was unveiled or put into formal use. It is evident that among the Maya of the Old Empire at least, the endings of their successive 1800-day periods were the times at which they erected or dedicated most of their monuments, in short the hotun endings usually indicate the contemporaneous dates.

	GLYPH G	GLYPH F	GLYPH E	GLYPH D	GLYPH C	GLYPH X	GLYPH B	GLYPH A	
No. 1. Tikal, Stela 3. 9.2.13.0.0 4 Ahau 13 Kayab.	D 								M
No. 2. Uaxactun, Stela 3. 9.3.13.0.0 2 Ahau 13 Ceh.	D 								
No. 3. El Pabellon, Stela 1. 9.10.0.0.0 1 Ahau 8 Kayab.	DM 								
No. 4. Altar de Sacrificios, Stela 4. 9.10.3.17.0 4 Ahau 8 Muan. Contemporaneous date 9.10.10.0.0 13 Ahau 18 Yaxkin.	D 								M
No. 5. Ixkun, Stela 2. 9.17.9.0.13 3 Ben 6 Kayab.	D 								M
No. 6. Ixkun, Stela 1. 9.18.0.0.0 13 Ahau 18 Mac.	DM 								
No. 7. Chichen Itza, Temple of the Initial Series 10.2.9.1.9 9 Muluc 7 Zac.	DM 								
No. 8. Holactun, Temple of the Initial Series. 10.8.15.4.9 7 Muluc 4 Pop (?). Contemporaneous date 10.9.13.0.0 2 Ahau 8 Yax (?).	D 								

SUPPLEMENTARY SERIES AT (1) TIKAL, (2) UAXACTUN, (3) EL PABELLON, (4) ALTAR DE SACRIFICIOS, (5-6) IXKUN, (7) CHICHEN ITZA, (8) HOLACTUN

		GLYPH G	GLYPH F	GLYPH E	GLYPH D	GLYPH C	GLYPH X	GLYPH B	GLYPH A	
No. 9.	Piedras Negras, Stela 25. 9.8.10.6.16 10 Cib 9 Mac. Contemporaneous date 9.8.15.0.0 10 Ahau 8 Tzec.	DM 								
No. 10.	Piedras Negras, Stela 31. 9.10.5.0.0 7 Ahau 3 Pax.	D 								M
No. 11.	Piedras Negras, Stela 36. 9.10.6.5.9 8 Muluc 2 Zip. Contemporaneous date 9.11.15.0.0 4 Ahau 13 Mol.	D 								M
No. 12.	Piedras Negras, Lintel 2. 9.11.6.2.1 3 Imix 19 Ceh. Contemporaneous date 9.11.15.0.0 4 Ahau 13 Mol.	D 								M
No. 13.	Piedras Negras, Stela 1. 9.12.2.0.16 5 Cib 14 Yax- kin. Contemporaneous date 9.13.15.0.0 13 Ahau 18 Pax.	D 								M
No. 14.	Piedras Negras, Stela 3. 9.12.2.0.16 5 Cib 14 Yax- kin. Contemporaneous date 9.14.0.0.0 6 Ahau 13 Muan.	D 								M
No. 15.	Piedras Negras, Stela 6. 9.12.15.0.0 2 Ahau 13 Zip.	D 								M
No. 16.	El Cayo, Lintel. 9.16.0.2.16 6 Cib 9 Mol.	D 								M

SUPPLEMENTARY SERIES AT (9-15) PIEDRAS NEGRAS, (16) EL CAYO

	GLYPH G	GLYPH F	GLYPH E	GLYPH D	GLYPH C	GLYPH X	GLYPH B	GLYPH A	
No. 17. Yaxchilan, Lintel 21. 9.0.19.2.4 2 Kan 2 Yax. Contemporaneous date 9.16.1.0.9 7 Muluc 17 Tzec.	D								M
No. 18. Yaxchilan, Stela 6. 9.11.3.10.13 5 Ben 1 Zotz.	D								
No. 19. Yaxchilan, Altar near Structure 44. 9.12.8.14.1 12 Imix 4 Pop.	D								M
No. 20. Yaxchilan, Lintel 29. 9.13.17.12.10 8 Oc 13 Yax. Contemporaneous date 9.17.0.0.0 13 Ahau 18 Cumhu.	D								
No. 21. Yaxchilan, Lintel 26. 9.14.8.12.0 6 Ahau 8 Yax- kin, or 9.14.17.12.0 10 Ahau 13 Yaxkin (?).	D								M
No. 22. Yaxchilan, Lintel in the Berlin Museum. 9.15.6.13.1 7 Imix 19 Zip.	D								M
No. 23. Yaxchilan, Lintel 46. 9.15.14.8.14 5 Ix 17 Muan (?).	D								M
No. 24. Yaxchilan, Stela 11 (front). 9.16.1.0.0 11 Ahau 8 Tzec.	D								M

SUPPLEMENTARY SERIES AT YAXCHILAN

	GLYPH G	GLYPH F	GLYPH E	GLYPH D	GLYPH C	GLYPH X	GLYPH B	GLYPH A	
No. 25. Yaxchilan, Stela 11 (side). 9.16.1.0.0 11 Ahau 8 Tzec.	D								
No. 26. Yaxchilan, Stela 1. 9.16.10.0.0 1 Ahau 3 Zip.	D								
No. 27. Palenque, Temple of The Cross. 12.19.13.4.0 8 Ahau 18 Tzec. Contemporaneous date undetermined.	DM								
No. 28. Palenque, Temple of The Sun. 1.18.5.3.6 13 Cimi 19 Ceh. Contemporaneous date 9.10.10.0.0 13 Ahau 18 Kankin	D		M						
No. 29. Palenque, Temple of The Foliated Cross. 1.18.5.4.0 1 Ahau 13 Mac. Contemporaneous date 9.13.0.0.0 8 Ahau 8 Uo.	DM								
No. 30. Palenque, Palace, House A, Pier. 9.8.7.7.7 ?? 7 Tzec.	DM								
No. 31. Palenque, Stela 1. 9.12.6.5.8 3 Lamat 6 Zac.	D								
No. 32. Ocosingo, Stela. Initial Series date undetermined.	D								M

SUPPLEMENTARY SERIES AT (25-26) YAXCHILAN, (27-31) PALENQUE, (32) OCOSINGO

GLYPH G

GLYPH F

GLYPH E

GLYPH D

GLYPH C

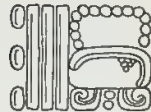
GLYPH X

GLYPH B

GLYPH A

No. 33. Naranjo, Stela 24.
9.12.10.5.12 4 Eb 10 Yax.
Contemporaneous date
9.13.10.0.0 7 Ahau 3
Cumhu.

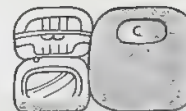
D



M

No. 34. Naranjo, Stela 29.
9.12.10.5.12 4 Eb 10 Yax.
Contemporaneous date
9.14.3.0.0 7 Ahau 18 Kan-
kin.

D



M

No. 35. Naranjo, Stela 23.
9.13.18.4.18 8 Eznab 16
Uo.
Contemporaneous date
9.14.0.0.0 6 Ahau 13
Muan.

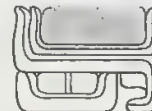
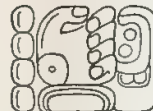
D



M

No. 36. Naranjo, Stela 30.
9.14.3.0.0 7 Ahau 18 Kan-
kin.

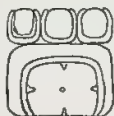
D



M

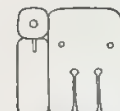
No. 37. Naranjo, Stela 13.
9.17.10.0.0 12 Ahau 8 Pax.

D



No. 38. Naranjo, Stela 14.
9.17.13.4.3 5 Akbal 11
Pop.
Contemporaneous date
9.18.0.0.0 11 Ahau 18
Mac.

D



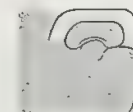
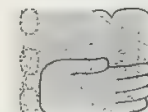
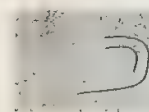
No. 39. Naranjo, Stela 8.
9.18.10.0.0 10 Ahau 8 Zac.

D



No. 40. La Honradez, Stela 7.
9.17.0.0.0 13 Ahau 18
Cumbu.

















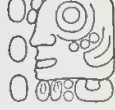
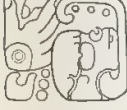







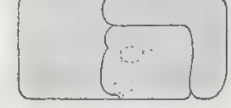
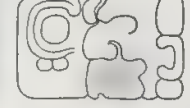
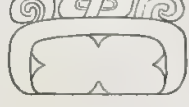

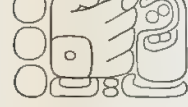























DM










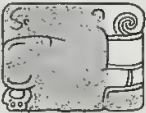

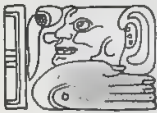




























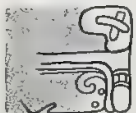








SUPPLEMENTARY SERIES AT (33-39) NARANJO, (40) LA HONRADEZ

	GLYPH G	GLYPH F	GLYPH E	GLYPH D	GLYPH C	GLYPH X	GLYPH B	GLYPH A
No. 41. Quirigua, Stela E (w). 9.14.13.4.17 12 Caban 5 Kayab.								
No. 42. Quirigua, Stela S. 9.15.15.0.0 9 Ahau 18 Xul.								
No. 43. Quirigua, Stela H. 9.16.0.0.0 2 Ahau 13 Tzec.								
No. 44. Quirigua, Stela J. 9.16.5.0.0 8 Ahau 8 Zotz.								
No. 45. Quirigua, Stela F. 9.16.10.0.0 1 Ahau 3 Zip.								
No. 46. Quirigua, Stela D (w). 9.16.13.4.17 8 Caban 5 Yaxkin.								
No. 47. Quirigua, Stela D (e). 9.16.15.0.0 7 Ahau 18 Pop.								
No. 48. Quirigua, Stela E (e). 9.17.0.0.0 13 Ahau 18 Cumhu.								

SUPPLEMENTARY SERIES AT QUIRIGUA














		GLYPH G	GLYPH F	GLYPH E	GLYPH D	GLYPH C	GLYPH X	GLYPH B	GLYPH A		
No. 49.	Quirigua, Stela A. 9.17.5.0.0 6 Ahau 13 Kayab.	D								M	
No. 50.	Quirigua, Zoömorph B. 9.17.10.0.0 12 Ahau 8 Pax.	D									
No. 51.	Quirigua, Zoömorph G. 9.17.15.0.0 5 Ahau 3 Muan.	D									M
No. 52.	Quirigua, Zoömorph O. 9.18.0.0.0 11 Ahau 18 Mac.	D								M	
No. 53.	Quirigua, Zoömorph P. 9.18.5.0.0 4 Ahau 13 Ceh.	D									M
No. 54.	Quirigua, Stela I. 9.18.10.0.0 10 Ahau 8 Zac.	DM									
No. 55.	Quirigua, Stela K. 9.18.15.0.0 3 Ahau 3 Yax.	D								DM	
No. 56.	Quirigua, Structure 1. 9.19.0.0.0 9 Ahau 18 Mol.	D								DM	

SUPPLEMENTARY SERIES AT QUIRIGUA

	GLYPH G	GLYPH F	GLYPH E	GLYPH D	GLYPH C	GLYPH X	GLYPH B	GLYPH A	
No. 57. Copan, Stela 20. Archaic Period.									M
No. 58. Copan, Stela 9. 9.6.10.0.0 8 Ahau 13 Pax.									M
No. 59. Copan, Stela 7. 9.9.0.0.0 3 Ahau 3 Zotz.									M
No. 60. Copan, Stela E. 9.9.2.17.0 10 Ahau 8 Uo (?) Contemporaneous date 9.9.5.0.0 9 Ahau 18 Uo.									DM
No. 61. Copan, Stela P. 9.9.10.0.0 2 Ahau 13 Pop.									M
No. 62. Copan, Stela 2. 9.10.15.0.0 6 Ahau 13 Mac (?). Contemporaneous date 9.11.0.0.0 12 Ahau 8 Ceh.									
No. 63. Copan, Stela 12. 9.10.15.0.0 6 Ahau 13 Mac (?). Contemporaneous date 9.11.0.0.0 12 Ahau 8 Ceh.									M
No. 64. Copan, Stela 3 (nodule). 9.0.0.0.0 8 Ahau 13 Ceh (?). Contemporaneous date 9.11.0.0.0 12 Ahau 8 Ceh.									

	GLYPH G	GLYPH F	GLYPH E	GLYPH D	GLYPH C	GLYPH X	GLYPH B	GLYPH A	
No. 65. Copan, Stela 10. 9.10.19.13.0 3 Ahau 8 Yaxkin.									DM
No. 66. Copan, Stela 19. 9.10.19.15.0 4 Ahau 8 Chen. Contemporaneous date 9.11.0.0.0 12 Ahau 8 Ceh (?).									D
No. 67. Copan, Stela 23. 9.10.? ? ? ? ? Contemporaneous date 9.11.0.0.0 12 Ahau 8 Ceh.	D								M
No. 68. Copan, Stela 13. 9.11.0.0.0 12 Ahau 8 Ceh.									DM
No. 69. Copan, Stela 3. 9.11.0.0.0 12 Ahau 8 Ceh.									D
No. 70. Copan, East Altar of Stela 5. 9.11.15.0.0 4 Ahau 13 Mol.	D								M
No. 71. Copan, Stela 1. 9.11.15.14.0 11 Ahau 8 Zotz. Contemporaneous date 9.11.15.0.0 4 Ahau 13 Mol.									DM
No. 72. Copan, Stela 1. 9.12.3.14.0 5 Ahau 8 Uo. Contemporaneous date 9.12.5.0.0 3 Ahau 3 Xul.	D								

SUPPLEMENTARY SERIES AT COPAN

		GLYPH G	GLYPH F	GLYPH E	GLYPH D	GLYPH C	GLYPH X	GLYPH B	GLYPH A	
No. 73.	Copan, Altar H'. 9.12.8.3.9 8 Muluc 17 Mol. Contemporaneous date 9.12.10.0.0 9 Ahau 18 Zotz.	D								M
No. 74.	Copan, Stela 6. 9.12.10.0.0 9 Ahau 18 Zotz.	D								M
No. 75.	Copan, Stela J. 9.13.10.0.0 7 Ahau 3 Cumhu.	D								M
No. 76.	Copan, Stela 5. 9.13.14.0.15 6 Men 18 Kayab. Contemporaneous date 9.13.15.0.0 13 Ahau 18 Pax (?), or 9.14.0.0.0 6 Ahau 13 Muan (?).	D								M
No. 77.	Copan, Stela A. 9.14.19.8.0 12 Ahau 18 Cumhu. Contemporaneous date 9.15.0.0.0 4 Ahau 13 Yax.	D								M
No. 78.	Copan, Hieroglyphic Stw'y, Mound 26, Date 24. 9.15.5.7.8 2 Lamat 16 Pax (?). Contemporaneous date 9.16.0.0.0 2 Ahau 13 Tzec (?), or 9.16.5.0.0 8 Ahau 8 Zotz (?).	D								
No. 79.	Copan, Stela M. 9.16.5.0.0 8 Ahau 8 Zotz.	DM								
No. 80.	Copan, Stela N. 9.16.10.0.0 1 Ahau 3 Zip.	D								M

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TABLE X

Initial Series Date not a Hotun Ending				Initial Series Date a Hotun Ending		
29-day month		30-day month		29-day month	30-day month	
NO.	NO.	NO.	NO.	NO.	NO.	NO.
I	38	2	30	6	3	56
4	46	5	31	15	10	58
9	65	8	33	37	26	59
11	66	13	35	39	40	61
12	72	16	41	44	42	62
14	73	20	60	48	43	63
17	76	21		50	45	64
18	77	22		53	47	69
19		23		54	49	74
24		25		68	51	75
27		28		70	52	79
34		29			55	80

endings appear to have been favored places for the interpolation of the extra 30-day months.¹

The sequence of the hotun endings at Quirigua, the most perfect series yet discovered, agrees with this generalization. Here, where fourteen successive hotun endings are recorded, nine fall in 30-day months and five in 29-day months, about a two-to-one proportion. See Table XI.

Although it is evident from Table X and from the special case of the Quirigua Supplementary Series in Table XI that extra 30-day

TABLE XI

Stela	S	9.15.15.0.0	9 Ahau	18 Xul	fell in a 30-day month.
Stela	H	9.16. 0.0.0	2 Ahau	13 Tzec	fell in a 30-day month.
Stela	J	9.16. 5.0.0	8 Ahau	8 Zotz	fell in a 29-day month.
Stela	F	9.16.10.0.0	1 Ahau	3 Zip	fell in a 30-day month.
Stela	D	9.16.15.0.0	7 Ahau	18 Pop	fell in a 30-day month.
Stela	E	9.17. 0.0.0	13 Ahau	18 Cumhu	fell in a 29-day month.
Stela	A	9.17. 5.0.0	6 Ahau	13 Kayab	fell in a 30-day month.
Zoömorph	B	9.17.10.0.0	12 Ahau	8 Pax	fell in a 29-day month.
Zoömorph	G	9.17.15.0.5	5 Ahau	3 Muan	fell in a 30-day month.
Zoömorph	O	9.18. 0.0.0	11 Ahau	18 Mac	fell in a 30-day month.
Zoömorph	P	9.18. 5.0.0	4 Ahau	13 Ceh	fell in a 29-day month.
Stela	I	9.18.10.0.0	10 Ahau	8 Zac	fell in a 29-day month.
Stela	K	9.18.15.0.0	3 Ahau	3 Yax	fell in a 30-day month.
Structure	I	9.19. 0.0.0	9 Ahau	18 Mol	fell in a 30-day month.

¹ It is impossible to classify seven texts, Nos. 7, 32, 36, 57, 67, 71, and 78, either because the Initial Series date is lost (Nos. 32, 57, and 67) or because the coefficient of Glyph A is effaced or missing (Nos. 7, 36, 71, and 78).

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months were interpolated at hotun endings, it is equally clear that if this same proportion of the 30-day months to the 29-day months had obtained throughout the sequence, the lunar calendar would very soon have run ahead of the actual lunar revolutions by nearly two days a year. In other words, such an arrangement would have over-corrected the calendar. Moreover, we have the evidence of the Dresden Codex to the contrary, that there was no such preponderance of the 30-day months over the 29-day months, as indicated by the current months in the hotun endings. Indeed we may safely conclude that hotun endings were particularly favored times for the interpolation of the extra 30-day months necessary to keep the lunar calendar in accord with the true lunar periods, and furthermore that this two-to-one predominance of 30-day months at these points does not extend to other parts of the sequence.

Acting on the writer's suggestion, Mr Carl Guthe, of the Division of Anthropology at Harvard University, made a number of arbitrarily arranged sequences of the numbers 29 and 30 in order to determine if any arrangement could be devised that would agree with the sequence of the lunar months as they are recorded at Quirigua in the fourteen successive hotun endings given in Table XI. Unfortunately the results of this investigation were not entirely satisfactory, and indeed it now seems probable that another important factor must be recognized as having heavily influenced the sequence of the lunar months among the ancient Maya.¹

Professor Willson has pointed out that pages 51-58 of the Dresden Codex are probably tables of possible solar eclipses, the ends of the successive groups being times at which solar eclipses were particularly likely to occur. A full presentation of his elaborate thesis, strongly corroborated by the numbers actually recorded, would require too much space here,² but it is evident that the total numbers of days from the beginning of the series to the ends of the successive groups so closely parallel the numbers of eclipse days on page 358 of Schram's table of lunar phases, that these can hardly deal with any other phenomenon. The arrangement of the successive lunations there recorded into groups of five or six lunations each can hardly be accidental, and we must recognize the eclipse phenomenon as one of the determining factors in the sequence of the lunar months among the ancient Maya.

¹ In a recent letter to the writer, Mr Guthe states that he has worked out two sequences which agree with the recorded sequences at Copan and Quirigua, the successful arrangements being adaptations of the lunar sequences of the Dresden Codex.

² The writer earnestly hopes that Professor Willson may soon publish his important discoveries in the Dresden Codex, the astronomical significance of which points the way to the decipherment of a large group of heretofore unknown glyphs.

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Were it not for this factor, it would have been possible to construct a much simpler and more accurate arrangement of the 29- and 30-day periods than that presented in pages 51-58 of the Dresden Codex. Thus, for example, a straight sequence of 61 lunar months beginning and ending with a 30-day month gives 1800 days, or exactly 1 hotun. The accumulated error in this period is 1.365+, or approximately $1\frac{1}{3}$ days, a hotun, and the interpolation of four extra 30-day months every three hotuns would have effected a close correction of the calendar. That the ancient Maya did not do this in the Supplementary Series, but that on the contrary they used a system of grouping like that in the Dresden Codex, is probably indicated by the fact that the bar-and-dot coefficients of Glyph C never rise above 6.

In the further elucidation of this problem the next point to be determined is the sequence of the 29- and 30-day lunar months as they actually occurred. Unfortunately a brief examination of the accompanying texts shows that the same Initial Series dates are not always accompanied by the same Supplementary Series. Take, for example, Glyph A in the texts shown in Table XII and note how its coefficients vary for the same Initial Series date.

TABLE XII

No.	Site	Date	Glyph A	No.	Site	Date	Glyph A
62	Copan	9.10.15.0.0	30	26	Yaxchilan	9.16.10.0.0	30
63	Copan	9.10.15.0.0	30	45	Quirigua	9.16.10.0.0	30
				80	Copan	9.16.10.0.0	30
68	Copan	9.11. 0.0.0	29	40	La Honradez	9.17. 0.0.0	30
69	Copan	9.11. 0.0.0	30	48	Quirigua	9.17. 0.0.0	29
13	Piedras Negras	9.12.2.0.16	30	37	Naranjo	9.17.10.0.0	29
14	Piedras Negras	9.12.2.0.16	29	50	Quirigua	9.17.10.0.0	29
24	Yaxchilan	9.16. 1.0.0	29	6	Ixkun	9.18. 0.0.0	29
25	Yaxchilan	9.16. 1.0.0	30	52	Quirigua	9.18. 0.0.0	30
	} same monument						
44	Quirigua	9.16. 5.0.0	29	39	Naranjo	9.18.10.0.0	29
79	Copan	9.16. 5.0.0	30	54	Quirigua	9.18.10.0.0	29

Although the Initial Series date is the same in each pair, and in one case, Nos. 24 and 25, both are from the same monument, the coefficients of Glyph A are sometimes different. This strongly suggests that

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the Supplementary Series, unlike the Initial Series, had different starting points at different cities; possibly Mr Goodman's *ab urbes conditâ* idea will even be found to apply. It is possible, on the other hand, that differently arranged sequences of the lunar months may account for the differences observed, though the writer rather inclines to the former view. This and many other points must be reserved for future investigation.

It is already apparent, however, that the Supplementary Series is a lunar count just as the Initial Series is a diurnal count; and furthermore, that the former depends on the latter for its variation in every case. Were it advisable to change the nomenclature of the two counts at this late date, the Initial Series might very properly be called the Day Series, and the Supplementary Series the Moon Series.

It is indeed a happy coincidence which permits the announcement of the meaning of this important group of glyphs on such a memorable and felicitous anniversary as the present.

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CARNEGIE INSTITUTION OF WASHINGTON
WASHINGTON, D.C.

Flint Working by Ishi

By NELS C. NELSON

INTRODUCTORY



THE very ancient art of producing implements from flint and allied stone substances by means of a fracturing process, though practised almost the world over, seems to have reached a really high state of perfection in only three localities, namely, Egypt, Denmark with adjoining parts of Scandinavia, and the Pacific coast of the United States. To be sure, choice bits of workmanship are to be found elsewhere, as for example in France and in Mexico, but these appear to be exceptions rather than the rule.

Just why these seemingly sporadic occurrences of excelling technique should be localized as they are is an interesting question because the manual dexterity implied might with reason have been looked for elsewhere, unless we at once yield the point that such dexterity is not a gift peculiar to any branch of mankind or, in other words, that the human factor is not the only factor concerned. For the present therefore the archeologist in attempting to explain these isolated appearances of highly cultivated flint technique can do little more than suggest that they were conditioned to some extent at least by two interdependent factors, the first being the presence of unlimited amounts of raw material and the other a grand scale of manufacture. The larger the output and the larger the number of artisans at work the greater the possibility of an expert—an artist—whose technique, once perfected, stood some chance of being copied and handed down.

If the archeologist is asked about the elements of the technique itself he is somewhat better informed. It is true he cannot state precisely how the exquisite knife-blades of early predynastic Egypt or the shapely daggers of Scandinavia were produced, but the methods involved in the making of a "Stockton curve" or any other delicately worked object to be found in the Pacific states is fairly well known. Methods of flint chipping have been observed and recorded in many places, especially in America, from the days of John Smith and Torquemada down to Catlin, Schumacher, and still others of recent date. In addition to these observations and based partly on them there has been done an immense amount of study and experimental

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work. A glance at the *Handbook of American Indians* under "Stonework" shows what interest the subject has aroused during the last four or five decades. Technology would seem to have been a favorite study, and no one has contributed more to the subject than Professor Holmes. The various processes of pecking, grinding, drilling, flaking, and chipping have all been more or less successfully duplicated. Perhaps none have become expert at flint chipping, for that we know, from the experience of the professional flint workers, requires time; but the arrowpoints, etc., scattered over the face of the earth are no longer mysterious darts from heaven. The art of producing them is well understood.

This being so, it may seem superfluous to record yet another observation on flint chipping. Nevertheless, without citing possible arguments in defense, I venture to describe once more the essential processes and also at the same time to call attention to the fact that a native Indian flint worker is living at present under conditions where he can be observed at work by anyone who will pay him a visit.¹

ISHI AND HIS WORK

During the early part of 1912, while connected with the University of California Museum at the Affiliated Colleges in San Francisco, I had opportunity to observe and in a measure to direct the activities of Ishi, the lately rescued survivor of the Yahi or Southern Yana Indians. Among other things suggested to him, partly to satisfy the interest of the visiting public, was that of chipping arrowpoints, and probably nothing else that he undertook proved of equal interest and satisfaction to visitors as well as to himself. He still keeps up the work and is not at all averse to having it inspected. Whether or not Ishi is an artist might be a matter for debate, but no one will deny that he is an experienced workman. This conclusion is based partly on a comparison of his productions with the best to be found in California and also on what the English flint workers at Brandon tell us as to the time normally required to master the art.

Unfortunately, what might perhaps be considered strictly scientific procedure was sacrificed at the beginning. In the first place, no considerable amount of raw obsidian being at hand, bits of heavy plate-glass were furnished, and Ishi, finding this substance somewhat less refractory than obsidian and much more easily worked than chalcedony, agate, and the like, soon offered mild objections to

¹ This was the case at the time these lines were written, but Ishi died in March, 1916.



a. The primary process—dislodging flakes from a piece of obsidian by means of a boulder



b. The secondary process—chipping the obsidian
STONE WORKING BY ISHI

NELSON—FLINT WORKING

using any medium except glass. This does not mean, however, that he could not be prevailed upon to work obsidian and other rocks. In the second place, Ishi, whether as a result of outside suggestions or his own intelligence I do not recall, found tools made of iron preferable to the old-fashioned implements of Indian manufacture. But while these facts might be urged as objections to the genuineness of his art, it still remains a fact that Ishi's method is his own and was mastered by him years before, probably with tools of the same general size and shape, if not actually of iron.

That iron tools are the best, considered from the point of view of the finished product made with them, is very doubtful; it is so hard and unyielding in comparison with bone or antler as to tend to bruise the edge of the obsidian; but, on the other hand, it keeps the point better and in that way saves time. With these facts in mind let us briefly consider what actually takes place when Ishi goes to work.

THE TOOLS EMPLOYED

Given a nodule of flint or a lump of obsidian, Ishi, in making a notched arrowpoint, let us say, employs three distinct processes, for each of which special tools ordinarily are required. The first process involves the division or breaking up of the obsidian mass to obtain suitable thin and straight flakes; the second process consists in chipping the selected flake to the size and shape of the arrowpoint desired; and the third and final process embodies, among other things, the notching of the base of the point to facilitate its attachment to the arrowshaft.

For the first process, that of dividing the obsidian mass, an ordinary hard, water-worn boulder may do, especially if only small flakes are wanted, the obsidian being broken up or a flake struck from it by a direct blow. But if a large spearpoint or knife-blade is ultimately desired, an intermediate tool is needed. This is apparently (Ishi never made one for me to see) a short, stout, blunt-pointed piece of bone or wood serving as a sort of punch and sometimes as a lever. As a matter of fact, what is wanted in the case of producing a large implement is not the division of the obsidian mass but the trimming down of this mass by the detachment from it of all unnecessary portions. A direct blow with a hammerstone might be fatal to the obsidian core being thus shaped, while an indirect blow, delivered through this punch, the same being held at a selected spot and angle, has some chance of success in removing the superfluous portions without shattering the whole piece to bits. A hammerstone then, or a hammerstone together with a punch, are the tools required

HOLMES ANNIVERSARY VOLUME

for the preliminary rough work, namely, the production of flakes or of a flaked core.

For the secondary flaking or, as it will be termed in this paper, *chipping*, a tool was made as follows: Ishi on one occasion took a common spike and at another time a piece of iron rod about the size of a lead pencil. He ground one end down about equally on two opposing sides, making a curving, chisel-like cutting edge, lenticular in cross-section—a tool of a nature half-way between an awl and a chisel. Around the butt-end a bit of cloth was wrapped to ease the handhold, and the chipping tool was finished. The notching tool was practically a duplicate of the preceding, but much smaller. A slender nail was sharpened as before and, being too small to be held in the hand as it was, the butt-end was inserted into an improvised wooden handle. The whole tool was nothing more nor less than a common awl. The two implements are shown in figure 1.

Another necessary item was a piece of leather or hide with which to protect the hand holding the obsidian during the chipping and notching processes.

Five things therefore seem to constitute the full complement of tools and accessories used in making the average chipped artifact. But more or fewer tools may no doubt be employed under extreme conditions.

METHODS OF WORK

Preliminary Flaking.—Unfortunately, while Ishi went through the motions of this process a number of times for me, I never photographed it, wishing first to be convinced of its feasibilities. But for reasons which I did not comprehend at the time, Ishi always refused to execute the process. Professor Kroeber has since been partly successful with him, and from his report I judge that Ishi's reluctance was due in all probability to the element of danger involved. Thus it appears that the first time Ishi was induced to try flake production he was cut about the face by flying bits of the glass-like substance and bled profusely. Quite naturally therefore the accompanying illustration of the act (pl. I, *a*), furnished by Professor Kroeber, shows Ishi with his eyes closed. This photograph, it should be explained, is not a mere

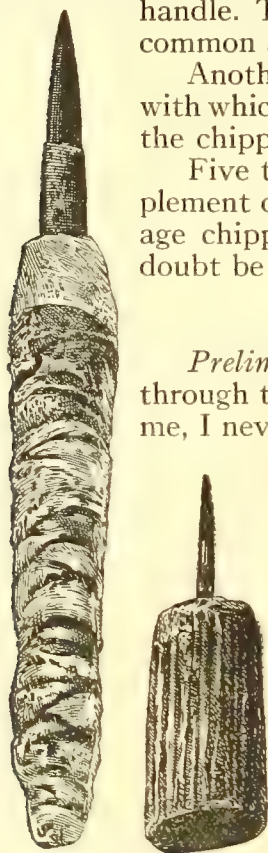


FIG. 1.—Flaking and notching tools used by Ishi.



MODE OF USING THE FLAKING IMPLEMENT BY ISHI



THE PROCESS OF NOTCHING AND SERRATING

NELSON—FLINT WORKING

pose; it is a selected view of the workman in action and as such tells a better story than words could do. Ishi holds a water-worn boulder in the right hand and a lump of obsidian in the left, and is attempting to break up the latter or to dislodge flakes from it by means of repeated direct blows. From among the resulting fragments he will pick out those most readily adapted to the purpose needed, let us say arrow-points, and proceed at once to shape them.

Secondary Flaking or Chipping.—Having selected a suitable flake, Ishi assumes the new pose shown in plate I, *b*, also kindly furnished by Professor Kroeber. The actual disposition of flake and tool is better indicated in the detail views of plate II. The flake to be worked will be observed resting on a bit of leather and placed transversely across the proximal fleshy part of the left palm and there held by one or more of the finger-tips. The chipping tool, grasped firmly with the right hand, is placed on the upper side of the flake, very close to the edge, and by a quick, downward pressure a chip is removed from the under-side of the flake. That much of this seemingly simple act will be noticed by any casual observer, but it may be well to analyze the act a little so as to show that it is after all not so simple as it looks. There is, so to speak, some knack about it. First of all we may note the fact, well shown in the illustration, that the axis of the tool used and the edge of the obsidian to be worked do not meet at a right angle, although they are in nearly the same plane. Secondly, and this does not show well in the illustration, the chipping tool is so turned on its axis that the plane of its cutting edge meets the plane of the flake to be worked at nearly, if not quite, a right angle. That this turn of the chipping tool is necessary or at least deliberate is certain because Ishi employs it invariably in the later stages of the chipping process, but not at all regularly in the early stages. Not having experimented very much, I am unable to say why Ishi proceeds as he does, but he gets results which I cannot imitate, try as I will. Ishi removes thin and fairly slender chips that extend two-thirds or more across the face of the flake, while my chips are thick and short. Consequently his arrowpoints when finished are thin and shapely, while mine, much to his disgust, are thick and clumsy affairs. My work resembles the abrupt Mousterian retouch, while Ishi's is the true Solutrian technique.

As to the actual movements involved in chipping, these would be rather difficult to describe. The pressure exerted, if not too great, comes mostly from a wrist action; but if greater weight is needed the leverage is thrown back to the elbow and shoulder. The precision of the movement in the later and more delicate stage of the work is

HOLMES ANNIVERSARY VOLUME

guided by placing the index finger of the tool hand against the edge of the palm on which the flake lies. The pressure is down, of course, rather than up, mainly in order to avoid the flying chips, and the chips being left in the palm of the hand absolutely necessitates the leather pad. Ishi works rapidly, reversing the flake often or not as conditions require. He begins chipping at the point on the flake nearest the tool and gradually works toward the farther end, and his best work appears to be done when he is chipping in a direction from the point end of the arrowpoint toward the base rather than when, on reversal, he must work in the opposite direction, i.e., from the base of the arrowpoint toward the point. Working in this manner Ishi can finish an arrowpoint of average size in half an hour, more or less, according to the nature of the substance he is working and also according to the adaptability of the flake originally selected. Having finished, he proceeds to the final step.

Notching and Serrating.—First of all, Ishi takes his leather pad, doubles it over the end of his left thumb, and ties it in place with a string. Then he grips the arrowpoint near the base, holding it firmly between the end of the protected thumb and adjoining index finger. With the right hand he directs the point of the notching tool against the edge of the arrowpoint at the place where the notch is to be, and by a slight pressure removes a small chip. The tool, as shown in plate III, is held perpendicular to the plane of the arrowpoint and is pushed forward as if to be driven into the end of the thumb. For each minute chip thus removed the arrowpoint is reversed until the notch is of the depth desired. The successful act requires some deftness, or the stem is sure to be severed from the blade of the arrowpoint. Ishi seldom fails, however, especially when working with glass, and he completes the two notches often in about half a minute's time. If the edge of the arrowpoint was to be serrated, Ishi would doubtless proceed in the same way, although I never asked him to try.

AMERICAN MUSEUM OF NATURAL HISTORY
NEW YORK CITY

The Dana Estes Collection of Bronzes in the Peabody Museum of Harvard University¹

By CHARLES PEABODY

HISTORY OF THE COLLECTION AND OF THE SITE WHENCE IT CAME



IN 1911 the Peabody Museum of Harvard University received a collection of prehistoric North Italian bronzes as a legacy from the late Dana Estes of Boston. This collection was gathered in the middle eighties² and came from a necropolis at Caverzano, near Belluno, in Venetia.

Comparatively little is known of the prehistoric Bellunese; the cemeteries seem to be composed of tombs arranged more or less in rows, containing vessels of clay and bronze; in these are cremated human remains, with accompanying ornaments and utensils of metal and other materials. Bronze is by far the commonest, but a good deal of iron and a little gold are found, as well as a fair proportion of terracotta vases. Beads and small things in glass, amber, resin, paste, bone, and stone, are common.

The work that has been done in this neighborhood is in a fairly restricted area, the Estes collection, as well as others now in Italy, having been found on the hill-slopes bordering the torrent of the Ardo, a tributary of the Piave which flows into the Adriatic, east of Venice.

The pioneer worker here was M. Leicht,³ whose description of the tombs and of conditions is entertaining. Speaking of an interview with the owner of part of the site, on the subject of previous explorations, he says:

Da essa [Signora Zanussi-Buzzati, the owner] seppi che nell'interno di queste celle mortuarie i vasi di bronzo cinerarii erano in vario numero e contenevano oltre alle ossa carbonizzate ed alle ceneri, anche varii oggetti di bronzo, e che la difficoltà di raccogliere quelli che si sono sottoposti quindi allo studio dipendette

¹ In writing this article the author wishes to acknowledge the aid and coöperation of Mr C. C. Willoughby, Dr E. A. Hooton, and Dr F. H. Sterns, of the Peabody Museum. Dr Sterns made all the negatives.

² In 1884 and 1885 according to an accompanying declaration of D. Francesco Pellegrini, signed at Belluno, July 20, 1887; in 1886 and 1887 according to Salomon Reinach in *The Nation* for Sept. 15, 1887.

³ *Atti. R. Ist. Veneto*, 1, 4, p. 891; vide also comment by G. A. Pirona, *ibid.*, pp. 871 ff.

HOLMES ANNIVERSARY VOLUME

particolarmente dalla lotta colla avidità contadinesca che sperpera ogni cosa pel più insignificante corrispettivo.

The reference is to the excavations of 1865, a time when the chronology of the metal ages was little worked out and the relative importance of the specimens not recognized.

In 1878¹ a more systematic exploration was commenced and numerous tombs were excavated; the summarized results make a fair table of contents for the Harvard collection itself: in bronze, situlæ, vases, and dishes; fibulæ, pins and needles, large and small; chains and bangles, ear and breast pendants; rings, bracelets, and armlets; hollow batons; sheaths and handles of daggers, and portions of richly ornamented girdles; in iron, fibulæ, knives, points, and axes. Besides, there are articles in bone, horn, glass, amber, resin, enamel, and stone, as well as terracotta.

Little information on the quantity and condition of the human remains is at hand; apparently cremation was the rule and deposition in bronze vessels followed; the tombs in which the vessels were put are somewhat like the stone-graves of Tennessee.²

THE COLLECTION

The Estes collection is here described according to the principal types of the specimens. In each case one of them has been chosen for illustration, and, where possible, a reference to an analogous specimen has been given. The method is more or less similar to that pursued in the colossal works of Montelius.³

FIBULÆ

Plate I

FIG. 1.—Bow semicircular; hinge composed of two and one-half circles to the left;⁴ needle plain; channel upright, short, opening to the left; ornament absent save for an attached spiral ring.

Vide Montelius' Series A, no. 25; Forrer,⁵ pl. 57, 4D.

Period (of which it is characteristic), Late Bronze age.

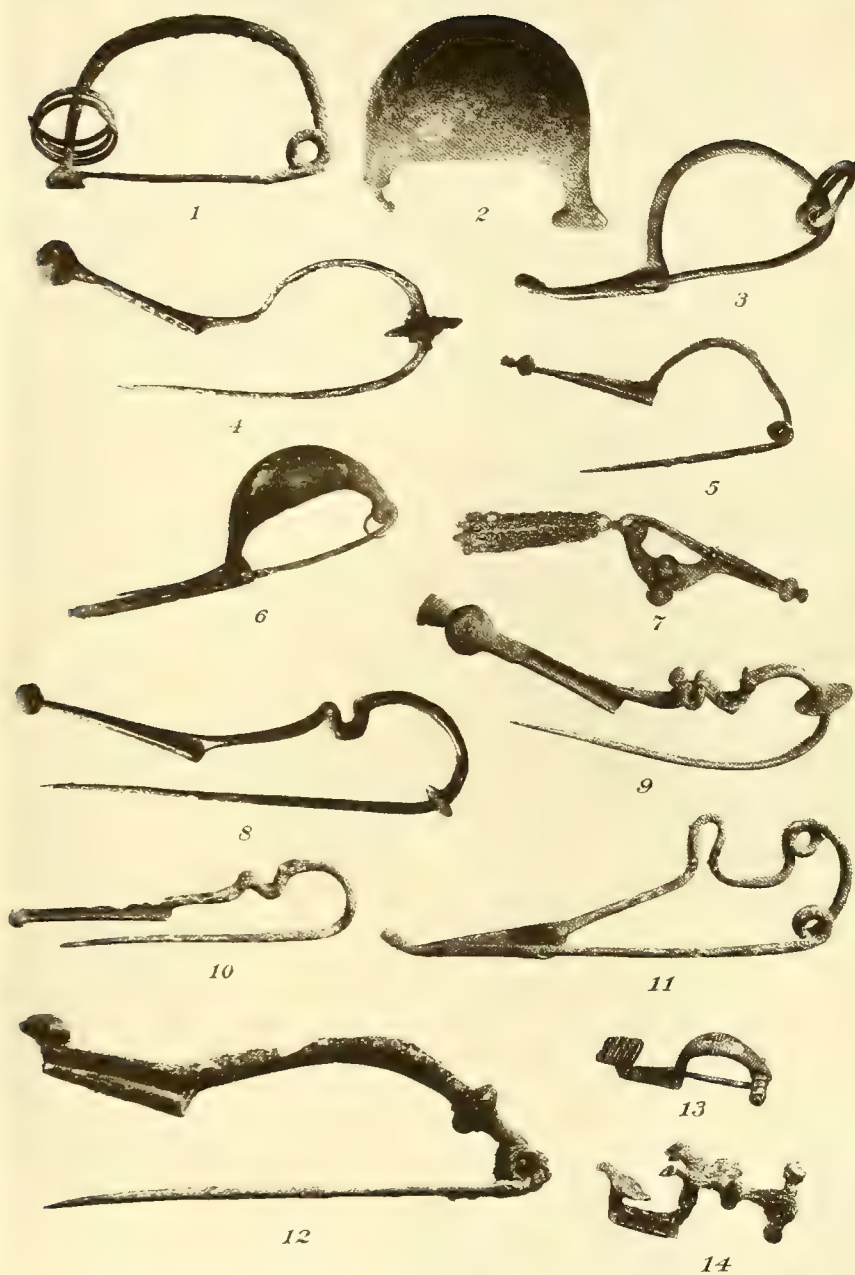
¹ Vide Gherardo Ghirardini in *Notizie degli Scavi*, 1883, pp. 25 ff., especially in relation to the excavations of Monti (pp. 29 ff.); cf. also Report of O. Monti, *ibid.*, 1884, pp. 173-174.

² The size of the Italian cists varied from about 1 m. 50 by .75 m. downward. The size of the stone-grave from Kimmswick, Missouri, reproduced in the Peabody Museum, is about 80 by 50 cm. Vide also Yarrow in *First Ann. Rep. Bur. Ethnol.*, 1879-80, pp. 113 ff.

³ *La Civilisation Primitive en Italie: Italie Septentrionale*, 1895; *Italie Centrale*, 1904-10. Pre-classical Chronology in Greece and Italy, *Jour. Anthr. Inst.*, xxvi, 1896-97, pp. 261 ff. *Die Vorklassische Chronologie Italiens*, 1912. In all cases a reference to Montelius in the text refers to "Italie Septentrionale."

⁴ The fibula is supposed to be viewed from above and from behind the hinge.

⁵ The references to Forrer are to his *Reallexikon der Prähistorischen, Klassischen und Frühchristlichen Altertümer*, Berlin and Stuttgart, 1907.



FIBULÆ

PEABODY—COLLECTION OF BRONZES

Length, 7.5 cm.
Museum no. 83360.

FIG. 2.—Bow globular, hollow; hinge broken off; channel short, opening to the left; ornament absent.

Vide Montelius: Ser. A, no. 60; Forrer, pl. 57, 6F.
Period, Early Iron age.
Length, 5 cm.
Museum no. 83595.

FIG. 3.—Bow semicircular; hinge, two and one-half circles to the left; channel nearly upright, long and with one egg-shaped knob at the end slightly elevated; decoration, incised circles round the knob and one ring attached to the hinge.

Vide Montelius, Ser. A, 84; Forrer, pl. 57, 8H.
Period, Iron age, II and III.
Length, 8.5 cm.
Museum no. 83550.

FIG. 4.—Bow arched, "ribbon" bronze; hinge absent, and a disc in its place; channel upright, long, and with a sphere at the end; decoration absent.

Vide Ghirardini-Monti,¹ type b (?); Déchelette,² fig. 266, I (Jura).
Length, 11 cm.
Museum no. 83457.

FIG. 5.—Bow semicircular, "ribbon" bronze; hinge, two and one-half circles to the left; channel upright, but high on the right side, with one spherical button followed by a double finial; decoration, criss-cross lines and transversals on both bow and channel.

Vide Ghirardini-Monti, type d (?).
Length, 8 cm.
Museum no. 83358.

FIG. 6.—Bow large, swelling, hollow; hinge, two and one half-circles to the left; channel upright, high on the right side, very long with finials; decoration, chevrons and transversals on the bow, and one ring on the hinge.

Vide Montelius, Ser. A, 109; Ghirardini-Monti, type g. (This is the "Navicella" type.)
Period, Etruscan.
Length, 19 cm.
Museum no. 83600. (Very common in the collection.)

¹ Op. cit., Not. Scavi, 1883, p. 31. So other similar references.

² Manuel d'Archéologie, II, 2.

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FIG. 7.—Bow large, swelling, hollow ("Kahn" or "Navicella" type): the bow carries three large knobs; hinge, two and one-half circles to the left; channel upright, high on the right, long with two spheres on the end; decoration, geometric designs and transversals on the bow, cross-hatchings on the channel, and a chatelaine bunch of four chains attached to the hinge (three of the chains end in spherical or pear-shaped pendants).

Vide Montelius, Ser. A, 116; v. Sacken,¹ pl. XIV, 4, and p. 62.

Epoch, Etruscan.

Length of the fibula, 10.5 cm.

Museum no. 83537.

FIG. 8.—Bow "snake"-shaped of "wire" bronze (the same type occurs with bows of "ribbon" bronze); hinge replaced by a disc; channel nearly upright, long, with a sphere on the end; decoration absent.

Vide Montelius, Ser. A, 274 and 275; Forrer, pl. 57, 19 H.

Period, Etruscan.

Length, 12 cm.

Museum no. 83458.

FIG. 9.—Bow "snake"-shaped, carrying two crumpled horns (on some specimens horns appear in one, two, or three pairs; they may be symbolical, by a sort of prehistoric synecdoche, of an animal); hinge replaced by one disc; channel upright, high on the right side, long, with a sphere and finial; decoration, lateral projections on the bow, and fine incised circular transversals about the end of the channel and the finial.

Vide Montelius, Ser. A, 261; Forrer, pl. 59, 8.

Period, Iron age, III or Etruscan.

Length, 11 cm.

Museum no. 83352.

FIG. 10.—Bow "snake"-shaped; hinge absent; channel nearly upright, high on the right side with one small knob; decoration absent. This complete absence of the hinge with a simple form of "arco serpeggiante" is very rare.

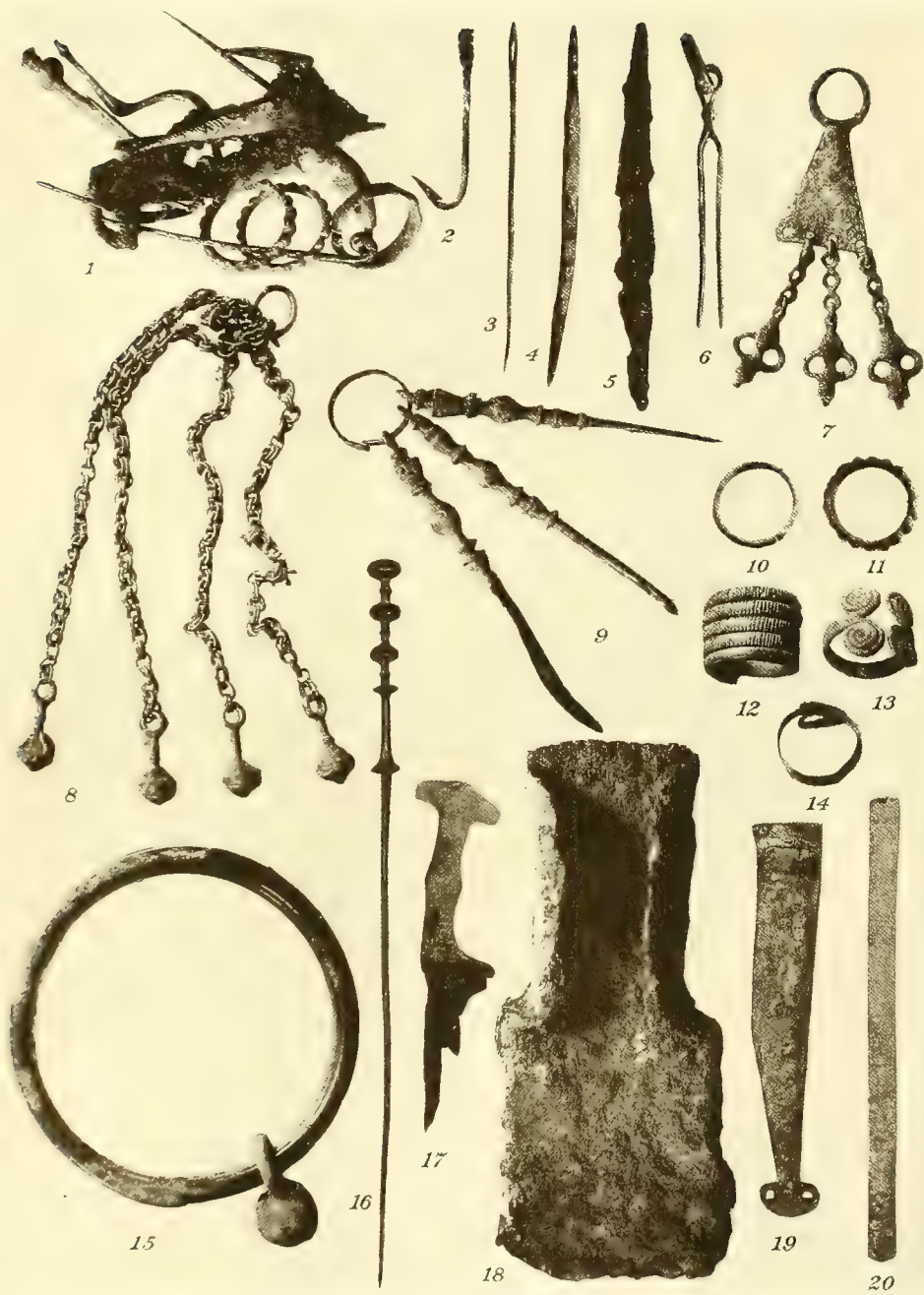
Period, rather late.

Length, 9 cm.

Museum no. 83458.

FIG. 11.—Bow, "snake"-shaped of "wire" bronze; hinge, two and one-half circles to the left; channel much higher on the right side,

¹ Das Grabfeld von Hallstatt, Vienna, 1868.



VARIOUS OBJECTS

PEABODY—COLLECTION OF BRONZES

long, and with an egg-shaped bulb, tilted (see fig. 3); decoration absent, save for rough circular transversals in intaglio near the bulb. A very rare form, but see Montelius.

Vide Montelius, Ser. B, pl. 41, 13.

Length, 12.5 cm.

Museum no. 83616.

FIG. 12.—Bow arched, expanding, "wire" bronze with a thick ring above the hinge; hinge two and one-half circles to the left; channel opening to the left, but covered and finished by an upright knob; the cover is winged and overspreads to the right and the left; Certosa type; decoration in doubt; the specimen is much corroded.

Vide Montelius, Ser. A, 147; Forrer, pl. 57, 1, 9; v. Sacken, pl. XIV, 6; Schlemm,¹ p. 80, fig. 2.

Period, Etruscan.

Length, 12.5 cm.

Museum no. 83355.

FIG. 13.—Bow semicircular, expanding, without any apparent cavity; hinge double (a coil surrounding a small bronze brad); channel upright and supporting a flat, square disc on the end; decoration, transversals on the bow and disc.

Vide Ghirardini-Monti, type h (?).

Period, probably late.

Length, 4.5 cm.

Museum no. 83481.

FIG. 14.—Bow a pure design; hinge absent (broken off); channel high on the right side; decoration: the bow represents a man (in a car) driving a team of three horses; the man's face is relieved by two depressions, giving the effect of eyes surmounting a broad grin; the horses' tails, manes, ears, eyes, and snouts are good; surmounting the channel is a bird (eagle?) with outstretched wings, as if in flight before this rampant "*triga*".

Vide Montelius, Ser. B, pl. 51, 4.

Length, 5.5 cm.

Museum no. 83705.

Plate II

FIG. 1.—Fragments of bronze and iron welded together in a sort of "magma"; there are in this mass one "Kahn" or "Navicella" fibula; two ribbon, expanding fibulæ, with buttons; one ribbon Certosa fibula; one long needle from a fibula; one disc-fibula with a rare winged bow; four bronze finger-rings, one small iron ring, and, holding

¹ The references to Schlemm are to her Wörterbuch zur Vorgeschichte, Berlin, 1908.

HOLMES ANNIVERSARY VOLUME

the whole mass together, what looks like a pair of iron tweezers, much rusted.

Length, 11 cm.

Museum no. 83588.

As a whole the fibulæ bear a close resemblance to the Este and the Bologna collections (this is quite natural), and to the Hallstatt types—also to some of the Castellieri types (St Canzian and others).¹ Less analogy is seen with French forms shown by Déchelette, Chantre, and others, or with northern forms from Germany and Scandinavia.

There are some specimens in the collection for which, thus far, the author has found no exact analogies; the differences are, however, not too great to account for by individual variation of fancy.

SMALL OBJECTS OTHER THAN FIBULÆ

Plate II

FIG. 2.—Fish-hook of bronze, barbed and with the upper part flattened and roughened for suspension.

Vide Montelius, Ser. B, pl. 2, 9, and Ser. B, pl. 3, 24; Forrer p. 245; Column I, s.v. "Fischfang"; v. Sacken, pl. XIX, 18 (p. 90); Schlemm, p. 5, fig. b, 1 (Schlemm does not mention Italy in speaking s.v. "Angelhaken von Metall").

Period, probably early.

Length, 5 cm.

Museum no. 83715.

FIG. 3.—Needle of bronze with a long eyelet.

Vide Montelius, Ser. B, pl. 91, 7; Forrer, p. 122, pl. 33, fig. 10; v. Sacken, pl. XIX, 14.

Period, probably early.

Length, 9.5 cm.

Museum no. 83716.

FIG. 4.—Awl of bronze. The instrument is double-pointed, one point being circular in section, while the shaft and the other point are square; this seems intended to secure a firmer insertion in some handle.

Vide Montelius, Ser. B, pl. 15, 7; Forrer, p. 433, pl. 110, 14 (hafted in bone).

Period, probably early, e.g., Copper age of the Lake-dwellers.

Length, 10 cm.

Museum no. 83523.

¹ Vide C. Marchesetti, *I Castellieri Preistorici di Trieste e della Regione Giulia*, Trieste, 1903.

PEABODY—COLLECTION OF BRONZES

FIG. 5.—Awl of iron, much corroded, somewhat resembling figure 18 in size and form.

Length, 10.5 cm.

Museum no. 83727.

FIG. 6.—Miniature tongs of bronze, with a ring.

Vide Montelius, Ser. B, pl. 7, 28, and Ser. B, pl. 73, 6 (neither of these is a perfect analogy); Forrer, p. 808, pl. 237, 37; v. Sacken, pl. XIX, 17.

Period, Late Bronze age or Early Iron age.

Length, 7 cm.

Museum no. 83521.

FIG. 7.—Trapezoidal chatelaine of bronze; such (or similar triangular forms) were a convenient and therefore a common means of suspension for bangles of great variety. The shape of the bronze pendants on the chain is not usual. Something like it may be seen in Schlemm, p. 8, fig. f. The ring for suspension is of one piece with the trapezoid; the latter is decorated with dots and circles in intaglio.

Length outstretched, 9.5 cm.

Museum no. 83488.

FIG. 8.—Chatelaine of bronze. There are four chains of double links attached to a ring and terminated at the other end by clapper-like bangles.

For this rare type of chain, vide Montelius, Ser. B, 47, 2.

Period, Iron age.

Length, 20 cm.

Museum no. 83665.

FIG. 9.—Ring of bronze holding small utensils. The ring serves the purpose of a modern key-ring. There are four similar sets of tools or ornaments in the collection; their use is not certain, but they all have an air of domesticity. In figure 9 is a graceful curved knife (nail-parer?), a square hook exactly the shape of an upright golf-cleek, and a broken stylus (?). Pincers, ladles, gouges, etc., also occur in the collection. Home surgery, the toilet, tattooing, cosmetic devices, depilatory practices, all may be guessed as explanations.

Vide Montelius, Ser. B, 46, 1.

Period, Iron age.

Length, 12 cm.

Museum no. 83398.

FIGS. 10-14.—Finger-rings of bronze. The first two show plain rings with indentations; very numerous in the collection.

Vide v. Sacken, pl. XVII, 3.

HOLMES ANNIVERSARY VOLUME

FIG. 12.—A ring of a common, broad type of coiled bronze, with cross-lines for decoration.

Vide Montelius, Ser. B, 29, 7.
Period, Bronze age.

FIG. 13.—A penannular ring of "ribbon" bronze, finished off with four flat spirals; common in the Estes collection.

Vide Schlemm, p. 147, fig. c (fewer spirals).

FIG. 14.—A ring of very rare form, a recoiled serpent; the overreaching and the recoiling recall the method of fastening some of the larger torques or of the modern snap-bracelets, but there was here no such object in view. The specimen is unique in the author's somewhat limited experience.

The diameter of all the specimens is about 2 cm.

The Museum numbers are respectively, 83508, 83372, 83513, 83507, and 83376.

FIG. 15.—An armlet or anklet consisting of an overreaching circle of thick bronze; it carries a bucket-shaped pendant, that creates a cheerful, metallic jingling.

Vide Schlemm, p. 336, b, and for the pendant vide Montelius, Ser. B, pl. 44, 7.
Period, Bronze age to Hallstatt.
Interior diameter, 8.5 cm.
Museum no. 83386.

FIG. 16.—Hair-pin of bronze, long and straight, resembling many from the Lake-dwellings; it is ornamented with a surmounting flattened sphere and with other symmetrical spherical and discoidal variations on the staff.

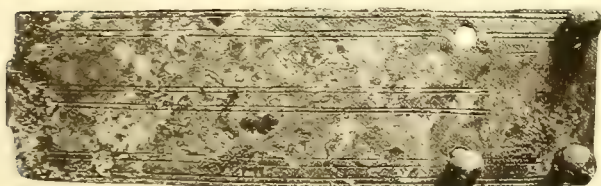
Vide Montelius, Ser. B, pls. 32.6, 44.13, 46.3; v. Sacken, pl. xv, 12.¹
Period, Iron age.
Length, 39.5 cm.
Museum no. 83437.

WEAPONS

FIG. 17.—Dagger of iron and handle of bronze, a not uncommon combination.

Vide Montelius, Ser. B, pl. 59, 12, and Ser. B, pl. 64, 6 (Belluno); v. Sacken, pl. vi, 11.
Period, late.
Length, 20.5 cm.
Museum no. 83504.

¹ Vide also Leicht in *Atti. R. Ist. Ven.*, 1871-72, ser. iv, vol. i, tav. III (Belluno).



ORNAMENT, BEADS, BELT, VASES, ETC.

PEABODY—COLLECTION OF BRONZES

FIG. 18.—Palstave of iron with a quadrangular blade and side wings curving inward on both faces; a rare form.

Vide Montelius, Ser. B, pl. 89, 2 (unilateral).

Length, 12.5 cm.

Museum no. 83597.

FIG. 19.—Sheath of bronze, made of a thin sheet bent and rolled over, and decorated with dots and concentric circles in intaglio. The point is finished in a double recurving motive.

Vide Montelius, Ser. B, 59, 12.

Length, 23 cm.

Museum no. 83499.

FIG. 20.—“Bâton” of bronze. This is a rolled sheet, perhaps formerly containing wood, ornamented with circular transversals; one end is broken. (Were these symbols of authority? One thinks of the discussion about the *bâtons de commandement* of Magdalenian times.)

Vide Montelius, Ser. B, pl. 54, 12, and Colini,¹ p. 204, pl. VI, 4 (Civitavecchia).

Length, 25.5 cm.

Museum no. 83533.

Plate III

FIG. 1.—Flat design in bronze in “contours découpés” representing a pair of human legs with a fringe (?) of clothing; a ring is inserted as if for suspension. The placing of the ring is, however, doubtful. There are small knobs on the surface which perhaps covered minute rivets, and the whole fragment may be part of a human figure “appliqué” on a bronze situla or other large vessel.

Length, 9 cm.

Museum no. 83445.

FIG. 2.—A series of beads in glass and amber of various shapes. The glass, with one exception, is dark-blue, and nearly all of the glass beads have an uncommon form: a cylinder with excrescences about the middle and expansions at both ends. (There are other beads in the collection, of shell and bronze and some made perhaps of minute pebbles.)

Cf. v. Sacken, pl. XVIII, 2 (blue glass).

Diameter of the largest bead, 1.2 cm.

Museum no. 83723.

BELTS

FIG. 3.—A fragment of a bronze belt made of plates riveted together. Designs of great beauty are often scratched on the belts.

¹ *Bollettino di Paletnologia Italiana*, 1909.

HOLMES ANNIVERSARY VOLUME

They are made up of straight lines, zigzags, chevrons, *dents de loup*, etc.

Vide v. Sacken, pl. ix.

Length of the specimen figured, 14.5 cm.

Museum no. 83495.

VASES

Plate III

FIG. 4.—Situla in bronze. This is a fine example of beaten bronze; the base is apparently a separate piece of metal; the form reminds one strongly of Hallstatt and Watch.

Vide Montelius, Ser. B, pl. 55; v. Sacken, pl. xx, 3 (save for separate base).

Period, Late Iron age.

Height to the rim, 19 cm.

Museum no. 83737.

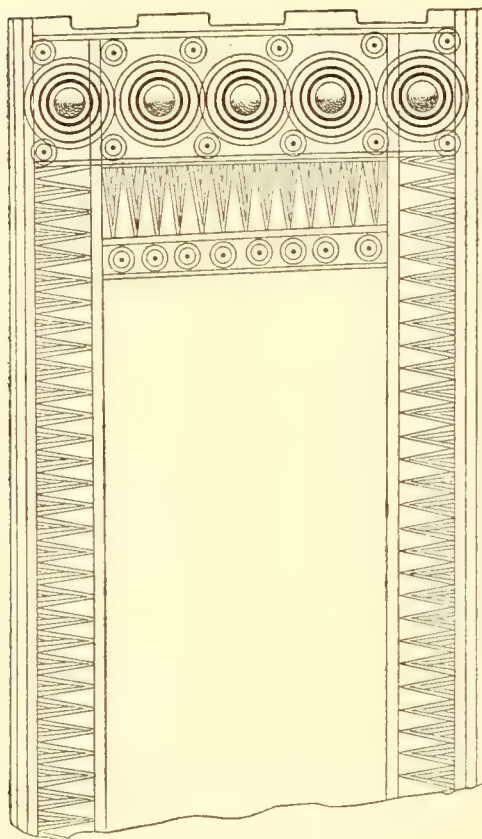


FIG. a

FIG. 5.—Vase of situla shape in clay; there are on it parallel bands originally colored alternately black and red; this feature is particularly to be noted in the pottery in the Museum at Este. (Other smaller vases, also expanding upward and with reentrant rims, occur in the collection.)

Vide Montelius, Ser. B, 58, 9 (Este).

Period, Late Iron age.

Height, 24 cm.

Museum no. 83743.

OTHER OBJECTS

FIG. 6.—A fragment cut probably from one of the long-bones of a large animal; it carries a zigzag incised decoration, and perforations as for the attachment of a top and bottom. No satisfactory explanation of its purpose has been put forward; it may have been a box or a standard, or perhaps a *revêtement* for the handle of an implement.

Height, 5 cm.

Museum no. 83751.

PEABODY—COLLECTION OF BRONZES

The etchers, inlayers, beaters, and molders of bronze at Belluno were pastmasters of their arts. The accompanying figures *a-d* show some of their designs.

FIG. *a*.¹—A fragment of a bronze celt carrying a pattern made up of *dents de loup* and concentric circles; it looks like a backgammon board.

Length, 10.5 cm.
Museum no. 83412.

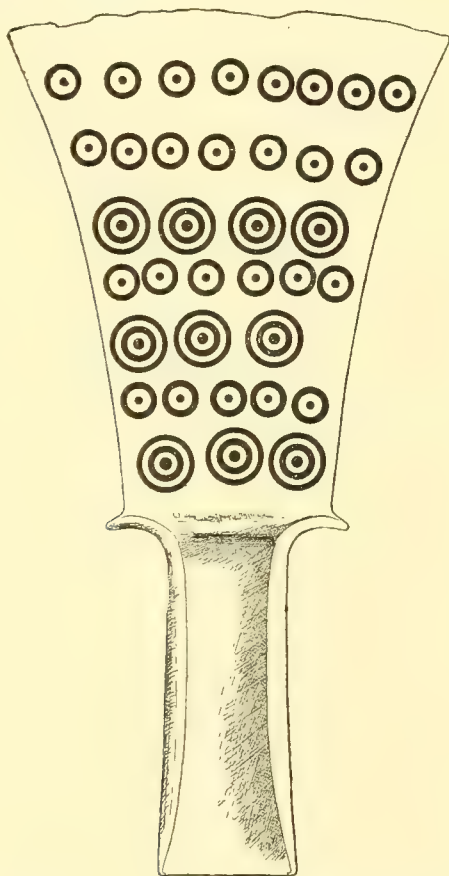


FIG. *b*

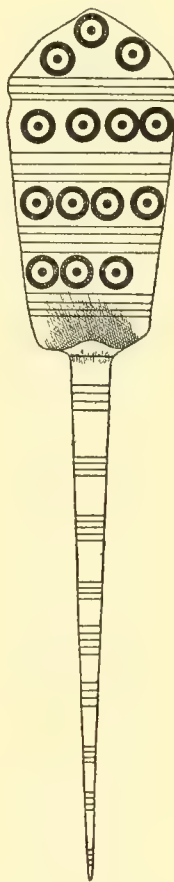


FIG. *c*

FIGS. *b* and *c* represent the faces and the sides of a bronze palstave—a combination of spots and of concentric circles.

Length, 17 cm.
Museum no. 83772.

¹ Figs. *a*, *b*, *c*, and *d* were done in pen and ink by Malcolm Willoughby, of Watertown, Mass.

HOLMES ANNIVERSARY VOLUME

FIG. *d*.—This is the pattern on the outside of an overrunning tubular bracelet (of course in development).

Interior diameter of the bracelet, 7 cm.

Museum no. 83379.



FIG. *d*

GENERAL REMARKS

A few charred fragments of bone in the collection are probably human; no animal bones appear. Bone was used sparingly in the manufacture of implements and ornaments by this people.

Glass appears in beads and in a spindle-whorl whose center is perforated and filled with a bronze spring in the shape of a pair of tweezers; this serves for suspension. The material of the whorl and this method of attachment are extraordinary.

The fibulæ, except the few with a double hinge, all have both hinge and channel on the left; it would however be reckless to suggest that this connotes any right- or left-handedness on the part of the makers.

Taking into consideration the position of Caverzano, the culture as a whole is easiest explained by assuming an infiltration of the Hallstatt-Bronze-Iron industries from the southeast. Further researches in the Carnic Alps may discover air-line routes from Belluno to northern Tyrol, to Hallstatt, and to the Danube valley, but this is not likely. Even the amber has probably been brought south from the Baltic and then back northward.

Nothing in the collection is at variance with such a theory of infiltration, and the other mooted questions of the movement of the metal cultures by land and sea may very likely remain undisturbed by the deductions from Belluno.

As regards date, there are no La Tène fibulæ, and practically the whole collection may be included in the Villanova period, plus the Certosa.

NOTE 1.—A coin of bronze with the inscription ΔΙΟΣ ΕΛΛΑΝΙΟΥ is included in the collection. Dr Malcolm Storer, Curator of Coins in Harvard University, has kindly identified it as a coin of Syracuse, 289 or 288 B.C. It may therefore be generously called a "stray".

NOTE 2.—Mr A. Wandtke, of Harvard University, has had the goodness to analyze a fragment of a horned "wire"-bow fibula, which consisted of about 13 per cent of tin and 87 per cent of copper. With this may be compared the following from Evans (in round numbers): Celt from Ireland: tin, 12.57 per cent; copper, 86.98 per cent. Caldron from Scotland: lead, 1.78 per cent; tin, 5.15 per cent; copper, 92.89 per cent. Dagger from England: tin, 14.20 per cent; copper, 85.33 per cent.

HARVARD UNIVERSITY
CAMBRIDGE, MASSACHUSETTS

Yacatas of the Tierra Caliente, Michoacan, Mexico

By GEORGE H. PEPPER



IN the winter of 1904, while journeying in Michoacan, Mexico, the writer explored certain *yacatas*,¹ or mounds, in the southwestern part of that state. These earthworks are situated on an old indigo plantation at San Antonio, twelve miles west of Apatzingan. At that time the plantation was controlled by a company, and it was on the courteous invitation of one of the owners, Mr Cobb, that the investigation was made possible.

Owing to the fact that the rainy season continued until the middle of December, a general investigation of the region was impracticable. Excavation was carried on in two mounds. The first proved to have had an old Spanish sugar-mill on its crest, the foundations for the machinery extending to a depth of six feet beneath the present surface. When this intrusive element was encountered, the work was transferred to another mound a few hundred feet from it, but owing to adverse conditions only a portion of the second mound was excavated. The explorations were not extensive enough to warrant definite conclusions respecting the structure of the mounds as a group, nor the relative positions of the burials in the mounds that were opened. The writer wishes merely to place on record the fact that certain of these mounds were used for burial purposes and to show the types of pottery that are found in the earthworks in this particular part of the Tarascan country.

So far as can be learned, no archeological work had been conducted in this region prior to our visit. Dr Carl Lumholtz traversed the territory west of Apatzingan and collected certain archeological specimens which are described in his *Unknown Mexico*, issued in 1902. Dr Nicolas León, Eduardo Ruíz, Dr D. José Guadalupe Romero, and various other writers have published general accounts of the region,

¹ This name is commonly applied to the mounds of the region. Eduardo Ruíz (Michoacan: Paisajes, Tradiciones, y Leyendas, Mexico, 1891, p. 46), quoting Humboldt, says: "*Yacatani* signifies, in Tarascan, 'to heap up stones with mud'; *yacata* is the substantive derivative of this verb." He also states that the cupidity of the conquistadores destroyed many of these old monuments. Dr Nicolas León (*Anales del Museo Michoacano*, Morelia, 1889, p. 27) gives the same derivation

HOLMES ANNIVERSARY VOLUME

but little has been recorded in regard to the yacatas of this part of the Tierra Caliente of Michoacan.

The mounds are irregular in shape and average from ten to fifteen feet in height. In the smaller one, the first to be investigated, excavation was commenced at the northern side. The first skeleton found was that of a child; it was greatly decayed, but enough remained to show that the body had been buried in a flexed position. Grouped about the head were two molcayetes, or bowls, one within the other, and two ollas. One of the molcayetes has a hole drilled in the bottom (pl. I, *d*). The skeleton found was that of an adult in an extended position; a molcayete rested on the feet, and two others and a small olla were near the skull.

After the second skeleton had been removed, a massive artificial wall of volcanic scoria was encountered. In removing the stones that formed this structure it was found to be of Spanish origin, as pieces of sugar molds were scattered throughout the soil beneath the stones. As this wall had been sunk to a considerable depth, the work was terminated and our efforts were devoted to another yacata nearby.

In all, three skeletons were found in the first yacata, including one that was taken out by one of the workmen after our investigations had been discontinued. This digging was done during our absence from the mounds, but fortunately we were able to recover the pottery that had been removed. With the three burials were fourteen vessels.

The results of the investigation showed that the first mound had been built, at least in part, of the refuse from houses or from old middens. Crude cooking jars filled with débris were found, their position seeming to indicate that they had been deposited with the refuse in them. Layers of ashes were encountered, and potsherds were found throughout the greater part of the explored area. There was no evidence of cultural stratification. Dissociated from burials was a flat mortar-like piece of pottery which will be described later. A grinding stone, an obsidian flake, and numerous large fragments of vessels were also found apart from human remains.

The second yacata was situated a hundred yards westward from the first one examined. A trench thirty feet wide, which included the greater width of the mound, was dug nearly to the center, when the work had to be discontinued.

The first burial encountered was that of an adult, represented only by the skull. East of the skull were a bowl and an olla, the former inverted and resting on the mouth of the olla. West of the skull was a large olla, crushed by the weight of a stone placed over it. Near this olla was another, of smaller size, with a cover of animal form.

PEPPER—YACATAS OF MICHUACAN

The second skeleton, that of a child, was found on the floor of the mound; the bones were decomposed and were coated with a thick layer of saltpeter. With this burial was a large molcajete.

Skeleton 3 was that of an adult, extended. Near the feet was a tripod molcajete, and four pottery vessels were grouped about the skull. This grave was lined on its western side with large flat pieces of volcanic scoria, and its eastern side was plastered.

Skeleton 4, an adult, was also extended. Near the skull was a tripod molcajete. West of the burial was the usual line of stones, the spaces between them being filled with small pieces of scoria and potsherds.

Skeleton 5, likewise an adult, lay extended. There was a line of stones west of the body; three molcajetes were grouped west of the skull, and a tripod molcajete was near the feet.

Skeleton 6 was also that of an adult, extended. Near the skull were three bowls and an olla, and another bowl lay near the left elbow. Vestiges of what were probably the remains of food were found in some of the vessels. With this body the first shell ornament was found: a large bracelet on a humerus.

Burial 7, an adult, had the usual line of stones west of the skeleton. Near the skull was a molcajete; a shell ring was found on a carpal bone of a finger of the left hand, and there were two shell finger-rings of similar form among the bones of the right hand. Under the chin were a few shell beads and two shell finger-rings; thus five shell rings were found with this burial.

In all the second mound contained seven burials, with which were twenty-four vessels of pottery, a shell bracelet, five shell finger-rings, and a number of shell beads.

In the general excavation of Mound 1, apart from burials, were found two large broken cooking jars, the first of which lay on the base of the mound and was filled with potsherds and other refuse. As this vessel rested on its bottom, with its wide mouth upward, it is impossible to say whether the contents were in it when it was deposited or whether it had become filled by the *débris* with which it was covered. The second vessel, however, which lay on its side, was filled with similar refuse, and evidently had been placed in position with its contents as found. Very few potsherds were found in the earth above it, and the general conditions preclude the probability that the vessel was filled after it had been placed in the mound. These jars were of coarse ware, eighteen inches in diameter, and no doubt were filled with refuse from a room or a refuse heap. It is possible that they were used for carrying material with which a part of the mound was built, and finally, with their contents, were left where found.

HOLMES ANNIVERSARY VOLUME

The flat, mortar-like clay tablet, hereinafter described, was found with a mass of potsherds; it was broken when found, was not associated with a burial, and evidently was a rejected ceremonial object. Not far from the second skeleton unearthed in the first *yacata* a crude stone grinder was found; it was associated with a mass of potsherds that formed an almost solid stratum in this part of the mound and which contained the largest fragments of pottery that were recovered, among them being the entire rim of a very large olla.

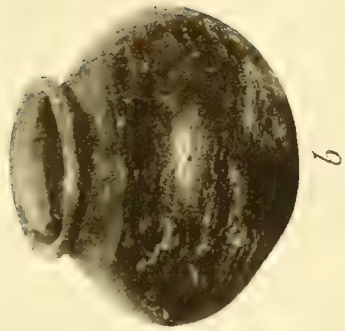
In Mound 2, dissociated from burials, was unearthed a large cooking jar, filled with potsherds and refuse as was the case with the vessels found in Mound 1. In the western part of this *yacata* a small olla and a shallow bowl were uncovered. There was no evidence of a burial here, but as these were the only vessels of this type that were dissociated from burials, it is possible that they may have been buried with an infant whose bones had disappeared through decay.

Two pottery jar covers were found in the *yacatas*. The larger one (pl. I, *a*), from Mound 2, is in the form of an animal; the lower part is square, the spread being five inches, and it is three and one half inches high. The walls of this cover are very thin, and the sides are arched in such manner as to form four legs, the lower extremities of which are the thickest parts of the object. The upper part of the cover is rounded, and a raised annular section rests on it; the upper edge of this ring is serrated, and from the frontal part an animal's head projects. Below the ring, at the back of the vessel and balancing the head, is a projection in the form of a tail. The cover was evidently designed to represent a turtle, and in confirmation of this belief are flipper-like projections on the upper part of each leg. These projections have longitudinal incised lines, as if to indicate the toe divisions of the flipper. Below the projections the legs of the vessel are undecorated. The entire space between the flippers and the ring referred to is filled with a design composed of curved lines and impressed circles, the latter made with the end of a reed or a similar instrument, and placed in groups above each flipper, under the head, above the tail, and beneath the raised rim on the other two sides. The upper surface, or the area within the ring, is devoid of ornament, but the presence of two openings mark the fact that there had been a handle. This cover was found in position over a small olla.

The smaller cover (pl. I, *c*), from Mound 1, is similar in form, has a square base, but is only three and three-quarters inches in width. The head and the tail of the turtle are not in evidence, but the flippers are shown on the legs of the cover, and a design similar to that on the other, composed of circles and rings, ornaments the upper part. A



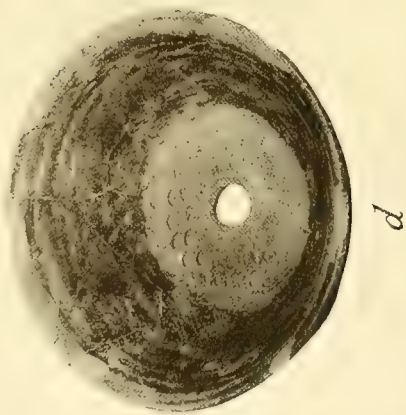
a



b



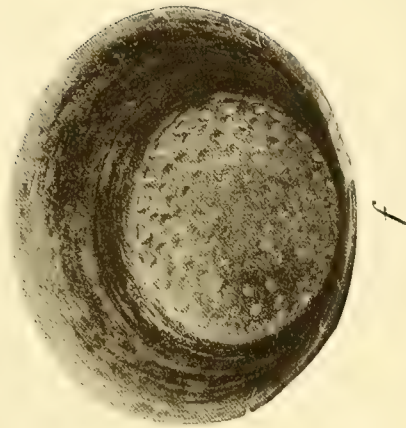
c



d



e



f

POTTERY VESSELS AND COVERS FOUND IN THE YACATAS

PEPPER—YACATAS OF MICHOACAN

tripointed handle spans the upper portion of the cover. Regardless of the fact that the chief physical characteristics of the effigy are not represented, this cover was unquestionably designed to represent a conventionalized form of the turtle.

These were the only covers that were found, but a fragment showing an arc of an annular ring similar to the one that ornaments the cover first described, was found in the excavation. Covers of this type have been found in other parts of southwestern Michoacan. Lumholtz¹ illustrates a cover of this general form.

The molcajetes, three of which are shown in plate I, *d*, *e*, *f*, are of the usual bowl form, each of them having either a low annular or a tripod base, the former predominating. Most of these vessels are of the flaring type, although in each series there are incurve forms. The general color of the ware is dull orange-brown; over this, in some cases, a red slip has been deposited, sometimes covering the entire interior, but generally forming a band about the inner rim. These vessels, as their name implies, were used for grinding chile and other articles of food. The lower part of the interior of the bowl is scored with some pointed implement, forming a corrugated grinding surface. In some the scoring takes the form of a design, whereas in others no ornamentation was attempted, the object being merely to produce a rough, irregular surface that would facilitate maceration of the food. As a rule the exterior of these vessels is plain, but a few of them are fluted, the straight or slightly wavy lines encircling the upper part (pl. I, *e*). One specimen (*f*) has four incised decorative patterns placed equidistant on the inner rim; these were cut after the vessel had been fired. Another (*d*) has a hole, three-quarters of an inch in diameter, drilled in the bottom. Whether this was done ceremonially, or whether the hole was designed for some utilitarian purpose prior to the use of the molcajete as a mortuary vessel, is not known.

The cazuelas, or bowls, with one exception are similar in size and shape to the larger examples of the molcajetes, and had the same low, annular base. The only variant is a small one of dull-orange ware; it is four inches in diameter by an inch and a quarter deep, and the interior is decorated with a red band composed of two encircling lines between which is a wavy line.

The ollas found in the mounds range from comparatively small ones (pl. I, *b*) to one eight inches in height. The smaller ones are plain, but the two largest examples have a decorative panel below the rim, in one instance extending to the shoulder of the vessel, and in the other to a point a few inches below the rim. All the ollas are of

¹ Carl Lumholtz, *Unknown Mexico*, vol. II, plate opposite p. 404.

HOLMES ANNIVERSARY VOLUME

the same ware with the exception of one of the large ones, which has a polished slip covering the entire surface, and another that was used for cooking purposes, the latter being the only one that shows evidence of contact with fire.

Pottery figures representing the human form are quite common in many parts of the Tarascan area, but in the mounds under consideration and in the area adjacent thereto only fragments were found. They are typical examples of the technique in vogue among the ancient inhabitants in representing the face. The treatment of eyes and mouth is somewhat unusual, and the general form of the face places the effigies in a class distinctly local in character. One pottery animal head and the stem of a pottery pipe were found.

Mention has been made of a flat, mortar-like clay tablet found in Mound 1. This specimen is seven inches square and three-quarters of an inch in maximum thickness, and the shallow depression is five inches in diameter. The sides taper from the edge of the depression, and the corners are slightly rounded. The surface is covered with a heavy red slip, but is without decoration. The use of this object is problematical, but it was probably employed in ceremony.

The results of the investigations in the two mounds seem to indicate that the bodies were interred in a ceremonial manner. Most of them lay on the back, in an extended position, with the arms at the sides; the head was toward the north, and the grave was marked by one or more stones set on edge. In no case was the grave inclosed with stones, but, as a rule, there were either four or five large pieces of volcanic scoria set on end along the western side of the grave, and almost invariably they slanted eastward. The spaces between the stones were chinked with small pieces of scoria and potsherds. Most of the large stones were irregular in form and were unworked. In some cases a flat stone rested horizontally over the head of the burial. The predominating mortuary offering was pottery, only two instances being noted where ornaments were buried with the dead.

Inability to continue the work made it impossible to determine how much of this group of yacatas has suffered from the inroads of the Spaniards. No evidence of building foundations or of other intrusive structures were found in Mound 2, and it may be that Mound 1 is the only earthwork that had been disturbed. In all events there remains an interesting field for future workers, and it is the belief of the writer that more extended exploration would result in adding much to our knowledge of the ancient people of the Tierra Caliente.

MUSEUM OF THE AMERICAN INDIAN, HEYER FOUNDATION
NEW YORK CITY

The Glazed Ware of Central America, with Special Reference to a Whistling Jar from Honduras

By MARSHALL H. SAVILLE



THE type of Central American pottery designated as glazed ware has long been known; indeed Professor Holmes made it a subject of study twenty-five years ago. The specimens of this peculiar class of American ceramics are easily recognized wherever found, being distinguished by a surface luster more nearly approaching a true glaze than that found on any pottery hitherto discovered in ancient America. The vessels are nearly all of a grayish-blue or greenish shade, mottled in places with spots or patches of darker hue; some are mottled with dull-red spots, while others are almost wholly of a brick-red color. Many of the vessels are decorated with the representation of a bird, an animal, or a human figure, modeled on the sides of the jar in relief; and these figures are hollow as a rule, being made separately and put on after the body of the vessel had been finished.

In January, 1892, while in charge of the scientific work of the first Honduras Expedition sent out by the Peabody Museum of Harvard University, the writer explored an important tomb (No. 1) near the southern slope of the Main Structure of Copan. In the tomb were uncovered, besides the skeletons, two beautiful peccary skulls engraved with figures and hieroglyphs, and five pottery vessels, four of which bear the glaze-like luster. One was broken into many fragments and was of reddish color; the others are of a steel-blue shade. The three unbroken specimens are shown in our plate I. Numbers 1 and 2 are now among the collections of the Peabody Museum; number 3 became the property of Honduras in the division of material under the terms of the concession, which granted to the Museum half of the objects found during the work of the expedition: it was placed in a small structure built by the expedition as a museum building, but it later disappeared with nearly all the collection retained by the representative of the Honduras government for the local museum. These vessels were the only ones found during the continued excavations made by the Peabody Museum in its several

HOLMES ANNIVERSARY VOLUME

years of work; and among the many thousands of potsherds encountered, not a fragment of this ware was found, attesting to its rarity and pointing to the fact of its introduction into Copan by trade from some other district.

The discovery of these vessels aroused the interest of the writer, who forthwith made a study of the geographical distribution of the type represented by them, and a list of the examples to be found in different museums both in America and in Europe, but the results of this study were not published. Since that time, more than twenty years ago, knowledge of the number of specimens of this class of pottery has increased to a considerable extent, but the geographical range of the objects has not been extended. The writer at that time was of the opinion that this class of ceramics had originated in the region of Alta Vera Paz, Guatemala.

In 1895, Dr Eduard Seler, of the Ethnographical Museum of Berlin, published his essay on the Antiquities of Guatemala,¹ in which he described and illustrated several examples of this ware from the Department of Alta Vera Paz, which he calls enameled ware. Seler draws attention to a vessel of this class found near Progreso, Yucatan, which was first illustrated and described by the learned Archbishop of Yucatan, Crescencio Carrillo y Ancona,² in *Anales del Museo Nacional de México* in 1885, and it is the first specimen of this type to be brought to the attention of the student, so far as the writer is aware. Carrillo y Ancona recognized the peculiar character of the ware, describing it as a "fine enameled pottery".

In his study of the Guatemala examples in the Berlin Museum, Seler writes:

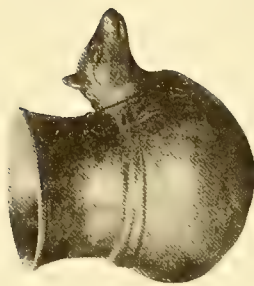
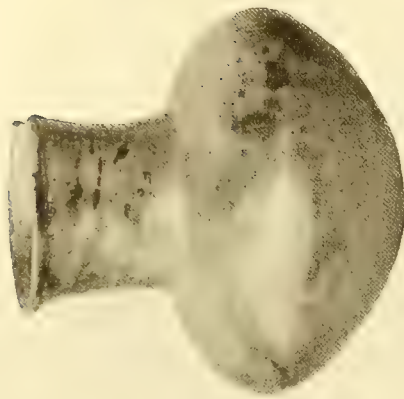
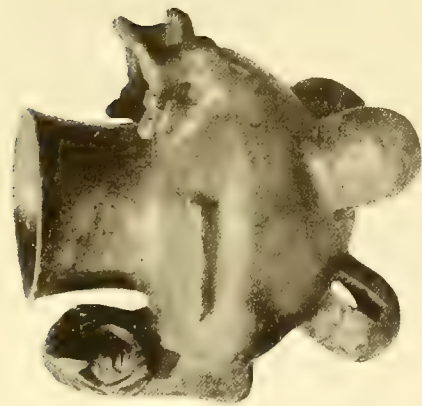
These vessels are distinguished from the well-known ancient American pottery by apparently having an actual glaze. . . . I have hitherto been unable to determine what kind of glaze is on these vessels, as rare and beautiful pieces were always concerned which could not be sacrificed to chemical investigation. However, there is hope that Mr Holmes, of Chicago,³ who at present is making a special study of these vessels, will throw light on this question. The broad geographic area within which these pieces are found proves that in them we have to deal with ware which was distributed by trade.

About the same time Dr Carl Lumholtz obtained for the American Museum of Natural History one of the most remarkable speci-

¹ *Alterthümer aus Guatemala, Veröffentlichungen aus dem Königlichen Museum für Völkerkunde, Band IV, Heft I*; translation published in *Bulletin 28, Bureau of American Ethnology*, 1904, pp. 106-109.

² Tomo III, entrega 7, "Los Cabezas-Chatas," p. 276, three views of vessel on the plate. The study was written in 1881.

³ At that time Professor Holmes was Curator of Anthropology in the Field Museum of Natural History.



1

2

3

VESSELS FROM TOMB 1, COPAN, HONDURAS

SAVILLE—GLAZED WARE

mens of ancient American ceramics thus far brought to light. It is of this same glazed ware, and was found in a tomb in the vicinity of Tepic in western Mexico, the northernmost limit of the area in which the ware has been found. This veritable treasure, which has been illustrated in colors by Lumholtz, is "designed and decorated in imitation of a turkey," and is further embellished by the addition of gold-leaf applied over a thin coating of white stucco. This sizing is placed on surfaces where the "glazed" surface has been ground off. This application of gold-leaf was probably accomplished after the vessel was brought to this part of ancient Mexico by trade; gilded beads and potsherds have been found in the region of the present state of Michoacan by Plancarte, and this type of decoration of pottery artifacts seems to be unique in this culture area.

Lumholtz had an analysis made of several small pieces of the base of this jar by Prof. Morris Loeb, of New York University, who found "that the smooth, glistening surface was not a glaze. . . . The analysis did not convince Professor Loeb that the 'glaze' and the body are of widely different material; nor that the glaze is more fusible than the body—rather the reverse. The body, although grey, contains very little carbon, whereas the glaze contains a large amount of it."¹

In 1900 the writer obtained two magnificently mottled specimens from the ruins of Teotihuacan, in the valley of Mexico, and these are now in the collections of the American Museum of Natural History. Several years later a number were found in a tomb in the same ruins, and are figured by Batres in his report on Teotihuacan published in 1906.² He describes one specimen as having "reflections of bronzed metal, color of Barbedienne patina." In various other publications, which we need not cite here, vessels of this type have been illustrated and it is safe to say that more than a hundred vessels of this ware exist either in private hands or in public museums. They have been found in the region embraced between the republic of Salvador in Central America and the territory of Tepic in Mexico.

More recently, in 1915, Spinden published his "Notes on the Archeology of Salvador,"³ in which he has attempted to classify the antiquities of that region by his system of art development, under "Archaic", "Transition between Archaic and Maya", "Maya", and "Post-Maya" periods. Dr Spinden assigns this "glazed-ware" pottery to the "Post-Maya" period, and illustrates several vessels of

¹ Unknown Mexico, vol. II, pp. 295-299, pl. vii.

² Plates I-VIII.

³ *American Anthropologist*, N. S., vol. XVII, no. 3, pp. 446-491.

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this type in private collections in Salvador. His description of the character of this ware is interesting and suggestive:

Without regard to the character of the decoration it may be classified at once by a semi-vitreous glaze. The ware is hard, thin, and fine-grained. The surface has a slight but unmistakable gloss, varying in hue from dull green to dull orange. The greenish variety predominates and it is likely that the orange-colored specimens were subjected to a reducing flame. In no one of the many examples that have come to the attention of the writer does the surface appear to have become actually liquid. Instead a slight suffusion seems to have taken place when the pottery was being fired. This may have been due to the presence of lead in the clay. . . . The suffused surface of this ware would not carry sizing or painted designs and as a result we find the ware decorated, first, by incised designs, second, by plastic designs. (Pages 470-471.)

Regarding Spinden's system of classification of this "glazed ware" in Salvador as belonging to his "Post-Maya" period, we must differ. He states that "there is good evidence that the great Maya cities of the south were abandoned soon after 600 A.D. and that the Maya tribe proper moved northward toward central and northern Yucatan. This left Salvador free from the pressure of Maya culture. The rise of the Toltec civilization in Mexico gave a new source of inspiration and influence." He further remarks that "although the finest examples of this ware probably antedate the Spanish epoch by several centuries, still it is worthy of note that the same greenish and semi-vitreous surface is seen on post-Spanish products."

This late origin for the "glazed ware" in Copan is of course impossible if the generalization of Spinden regarding the abandonment of the Maya cities about 600 A.D. is correct. The pieces found by the writer in the Copan tomb, with the carved peccary skull and the painted vessels, must be attributed to the best period of Copan development. In this case, at least, the ware is of respectable antiquity, so far as remoteness from the Spanish period of occupancy is concerned. We have never seen any specimens that in any way are to be regarded as resembling a Spanish type of decoration.

The writer is of the opinion that the ware should be considered as the product of some local tribe or clan which developed this particular type of ceramic art. Whether the place of origin is Salvador or Guatemala is at present undetermined, but future research in this important part of Central America should elucidate the problem.

During the summer of 1915 the writer was engaged in an archaeological reconnoissance in the Department of Cortés, Honduras, for the Museum of the American Indian, Heye Foundation, during which he was able to bring together an interesting collection from the region of the valleys of the Ulua and Chamelicon rivers, supplemented by



WHISTLING JAR FROM THE REGION OF RIO ULUA, HONDURAS

Museum of American Anthropology
No 1472

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an important collection gathered by the late Dr J. E. Austin, for many years a resident of Puerto Cortés. In the Austin collection was the glazed-ware whistling vessel that affords the special reason for the preparation of this paper.

The vessel (pl. II) is $10\frac{1}{2}$ inches high and has an extreme length of $9\frac{3}{4}$ inches from the back of the figure to the front of the bowl. It is of a dark steel-blue color, with but little mottling or change of shade as in many examples of this class of ancient American ceramics, an exception being a small section of light-orange tint on the bowl and faint traces of the same color on the back of the figure. In the modeling of the seated human figure which the vessel represents, slight attention has been paid to proportion, the lower part being almost without semblance to that of a human figure. The legs are represented only in the mass, and there is an incised oval where each knee should be. The head is upraised and hollow in front. The mouth is open and teeth are shown. Typical plugs are in the large ears. The forehead is low and is covered almost entirely by a band which winds backward down behind the ears. Extending from the base of the head downward well on the back is a flap like an elongated visor of a cap, which may be intended to represent a head covering. On the chest is an ornament like a long pendant bead with a longitudinally grooved cross-piece projecting through it; this pendant is attached to a band with diagonal lines evidently depicting a heavy cord, which is tied with a large knot on the back of the figure just below the flap-like head covering. The ends of the cord are fringed. A loin-cloth is shown tied with a large knot in the back.

On the lap is an olla-shaped vessel held in place by each crudely shaped hand. This olla is of the typical form that characterizes the majority of specimens of this "glazed-ware" class of pottery vessels. On the front of the bowl was formerly a projecting animal or bird head; in the hole is a hemispherical nodule of copal, probably placed there by the modern finder of the vase. The back of the head contains the vent of a whistle, the mouth or blowing end being concealed in the front of the human figure below the waist at a point slightly below the median line of and inside the body of the olla. The arms are hollow and there are openings on the shoulders and elbows undoubtedly to allow the insertion of cords for the suspension of the vessel. Thus suspended, and the bowl filled almost to the base of the neck with water, a slight swinging movement to and fro, even that caused by a gentle breeze, will result in forming a vacuum and the expulsion of air through the whistle, emitting a clear and sustained note. It was doubtless used in temple ceremonies, possibly either hung up at

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the entrance of a chamber or carried by a priest, and the whistling produced by the mere movement of the water in the vessel, while walking.

This specimen is unique in mechanism in ancient American ceramics, so far as the writer is aware. Moreover, whistling jars are practically unknown in Central America and Mexico. The principle of the whistling jar is relatively common in the ceramic art of the pre-Quichua inhabitants of the Peruvian coast, and the writer has described and figured¹ an example from the coast of Manabi, Ecuador, slightly different from the general specimens of this class from Peru. In this well-known type the note is given out only when the water is poured from the jar. Specimens have been described so often and are found in so many Peruvian collections that further description would be superfluous.

The specimen just brought to the attention of students is but another proof of the richness of the archeological field of Central America, where so little intensive exploration has been undertaken and indeed large portions of the country have as yet not even been visited by the explorer. The same is true of Mexico, and it cannot be too urgently insisted that our museums should consider coöperative plans for systematic and long-continued investigations in these important areas. The writer firmly believes, after considerable experience in Latin America, that the Middle American governments would be extremely favorable to concerted action by our scientific institutions if definite plans were formulated by them for the prosecution of such work.

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¹ Antiquities of Manabi—Final Report; *Contributions to South American Archeology*, vol. II, pp. 223-224, pl. c, 6, New York, 1910.

An Ancient Archeological Site on the Lower St Lawrence¹

By FRANK G. SPECK



IN June, 1915, while making inquiries among the survivors of the Tadousac band of Montagnais at Tadousac, P. Q., I learned from the natives that stone implements had been found upon a high sandy hill, known locally as Côte de Sable, overlooking the village. Although the assertion seemed preposterous at first, I decided to investigate, because the finding of artifacts at such a height and at such a distance from the river would offer material for an interesting problem. My interest was aroused, moreover, by the fact that archeological material from this general area is exceedingly rare. The problems concerned in the lower St Lawrence region are these: (1) To what extent did the Iroquois anciently occupy the lower river? (2) How far up did the Eskimo formerly range? (3) Was there another group of people in this region before it was inhabited by historic tribes, and, if so, were these related in any way to the Beothuk of Newfoundland or to those responsible for the so-called "red-paint" burials in New England? (4) How far and how anciently did the present inhabitants, the Montagnais, occupy the northern shore?

The first two questions should not be difficult ones to settle with an adequate accumulation of archeological material and the examination of sites. The last (4), also should not be particularly difficult, although the acculturation of Eskimo features of life by the Montagnais as the latter emerged from the interior to the coast might lead to confusion in identifying implements. In regard to the third question, however, we meet with difficulty from several points, the first being actually to establish an identity for a people who are known only by one tribe, the Beothuk, which had become practically extinct before anything had been learned in detail of its language or culture. The general supposition that Beothuk may be a divergent, early eastern Algonquian branch, which is indeed suggested by some historical and linguistic conclusions, would correlate the question in the St Lawrence region with that of the northern New England

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coast and that of the maritime provinces of Canada. The latter supposition is based on the reports of Willoughby,¹ Moorehead,² and Dixon,³ who have concluded from their archeological investigations in Maine that a proto-Algonquian culture existed in this region. It has furthermore been brought out that this culture, owing to certain peculiar traits, such as the abundant use of red ochre, the absence of many types of manufactures, and the frequent occurrence of long, slate lance-heads, gouges, large chipped blades, and tapering chisels, may have been related to the famously convenient Beothuk. While the principle of identifying one type of culture with another on the basis of a few general resemblances is, of course, inadvisable, nevertheless, the fact that we have so little knowledge of both these ancient groups perhaps gives a few resemblances of the kind mentioned a little extra weight in the opinions of the supporters of the theory. However it may be, at least in this initial stage of our study, evidence now seems to be accumulating in favor of the idea that a type of culture earlier and cruder than the historic Algonquian was at home in the lower St Lawrence maritime provinces and northern New England area. Hence by coördinating the remainders, it might be thought that the Beothuk formed the last isolated outposts of this culture. Finally, should we accept the evidence of Algonquian linguistic and ethnological resemblances to Beothuk as conclusive of relationship, we should have to assume that the early culture type belonged to a primitive Algonquian group antedating the later Algonquian occupants. A certain confirmation is lent this theory by certain uniformities in the simplicity of types in archeological material so far as we have it from the region under discussion. A further fundamental ethnic simplicity is a uniform characteristic of the Algonquians both north and south of the St Lawrence, this simplicity extending through social, ceremonial, artistic, and industrial life. May this prominence of negative traits not be a surviving feature indicating the tribes of the region to be representatives of an early wave of Algonquian culture?

To return to the subject under discussion, for the want of a better idea at present, I am inclined to regard the Tadousac material, and perhaps the Maine archeological material as well, as coming from

¹ C. C. Willoughby, Prehistoric Burial Places in Maine, *Archaeological and Ethnological Papers of the Peabody Museum, Harvard University*, vol. I, no. 6, pp. 50-51. Also discussion by Willoughby of The Red-paint People of Maine, *American Anthropologist*, vol. XVII, no. 2, 1915, pp. 406-9.

² W. K. Moorehead, The Red-paint People of Maine, *American Anthropologist*, vol. XV, no. 1, 1913, pp. 33-47. See also vol. XVI, no. 2, 1914, pp. 358-361, and Mr Moorehead's paper in the present volume.

³ R. B. Dixon, The Early Migrations of the Indians of New England and the Maritime Provinces, *Proceedings of the American Antiquarian Society*, April 1914, pp. 3-14.

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the primitive eastern Algonquian period just mentioned. Coming from such an early period and under physical conditions somewhat similar to those surrounding the Eskimo, this hypothesis would allow for a certain Eskimo similarity, which indeed is not to be overlooked in other branches of ethnology, such as mythology, material life, and social organization.

LOCATION OF THE SITE

Tadousac, at the mouth of the Saguenay, lies in a Laurentian locality. At this particular place, owing evidently to the Saguenay glacier, great terraces of yellow sand form the shores of the St Lawrence, beginning just behind the village and extending southeastwardly along the river for at least four miles. There are several of these terraces, the first by ocular estimate being about 60 feet above the river, the next about 150 feet above, and in some places another about 200 to 350 feet. Locally turf and trees have grown over these dunes, leaving only the wind-blown face toward the stream steeply exposed, and changing according to the disturbances of wind and sea.

At Tadousac, directly within the harbor of the old village, upon the first terrace (60 feet), is the site of the old Tadousac mission, founded by the Jesuits in 1616. Here an extensive flat, near the old chapel of the Jesuits but now occupied mostly by the Tadousac hotel, shows signs of former Indian occupancy in the form of some chips and implements. With these are also found iron and other metal artifacts, relics of the first mission period, denoting that here lived the Montagnais who gathered in such numbers annually, as we learn, to attend the church rites. The lower terrace, then, may be regarded as the site occupied by the Montagnais of historic, Christian times.

On the next terrace, however, in the rear of the village and separated from it by a ravine some fifty feet in depth, through which flows a brook, is the ancient site. Here an extensive flat, dotted with a few clumps of spruce and in places showing a turf covering, though most of it is exposed yellow sand, must have been fairly covered with aboriginal camps, if one may judge by the distribution and quantity of chips, flakes, blades, chisels, and scrapers of various kinds that are to be found, in every stage of manufacture, scattered over the surface. It may be presumed that originally, when the site was occupied, the whole place had a turf covering, the wind in later times having blown it free and rolled up some temporary dunes of a secondary sort here and there on the flat. I estimated this inhabited tract to be about two thousand feet back from the shore.

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Back of the inhabited terrace is still another sand hill, but this shows no signs of human occupancy. While mentioning the exposed sandy nature of the inhabited flat, it should be noted that the strips of turf-covered ground still probably contain undisturbed material, because the exposed spots all over show the same abundance of rejected and finished objects.

An additional feature of physiographic importance is the fact that just east of the principal site across the main stream flowing through the ravine is another tract yielding objects of the same nature. This is less extensive, because it is bounded by a high, wooded hill. Consequently we have this question to consider: Was the terrace inhabited before the brook had cut the ravine to such a depth? And, secondly, considering the erosion of the brook ravine, was the terrace nearer the level of the St Lawrence in the era of occupancy, to the extent that it could actually have been a shore site instead of a terrace-top site?

REMARKS ON THE MATERIAL FOUND

In the collection submitted to the Geological Survey of Canada, practically everything of a portable nature is included. A number of large, apparently unfinished axes, mauls, or similar tools, averaging about ten pounds in weight, were intentionally left on the site until further exploration can be undertaken. Also badly battered, worn, or unfinished, rudely outlined chisels and like implements were cached on the site.

Everywhere on the surface are to be found abundant chips, flakes, and nodules of the stone used by the implement makers. The material is mostly quartzite, while considerable crystal occurs. A few chert and flint pieces were found, and a few of slate.

Many unfinished artifacts and rejects occur, the proportions of these of course being in excess of the finished tools. As these are of little interest, except to the technologist, I will make a few comparative remarks on such implements as may be considered more or less complete, or at least characteristic.

The two articles of commonest occurrence are: first, quartzite blades, generally ovate in shape and ranging from several inches to five or even six inches in length; and second, chisels or gouges of hard, igneous stone. The occurrence of these two types of tools in such great excess of other types is similar to the situation in Maine.

Next come scrapers, crude and finished in varying degrees. Some are like the so-called "turtlebacks", others are apparently of

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the "semilunar" knife or scraper type. The semilunar scraper for cleaning skins is well known among the present Montagnais, who term it *cak^whi'gan*, "scraper". They now employ iron semioval-shaped blades set in a horizontal handle of bone or wood.

The quartzite scrapers of this type are recognized by the Montagnais as the prototype of their iron tools. Needless to say, both the stone and the iron ones are used by Eskimo as well as by Montagnais.

Very few arrowheads occur, only two or three that could have been nothing else. One of the smallest of the collection is of crystal, not more than three-fourths of an inch in length.

As to the larger blades, the Montagnais call them either knives or lance-heads.¹ Some of them appear as though they might have served as knives with a piece of skin wrapped at one end as a handle.

Another type of blade, not very common however, is squarish, about an inch in diameter. This resembles the "planing-tool" blades of the Eskimo.

As usual, some of these variously shaped quartzite tools are of problematical use.

In heavier tools we have first pestle-like stones weighing several pounds, tapering and cylindrical, and frequently with a projection or knob on the side to facilitate gripping. These stones are still used by the Montagnais in the bush, on rare occasions, as crackers to break caribou bones in order to secure marrow.

Next are the chisels or gouges of various sizes, shapes, and degrees of finish, already mentioned.

Another class of articles may be called chisels. They are finer, with well-worn and smoothed blade edges and tapering backs. The material is generally softer stone; most are of slate.

Again, the long slate and argillite lance-heads, either round or four-sided in section and eight or ten inches long when perfect, are important, because the same type of implement is found in the lower strata of finds in Maine.² Only one perfect specimen of this implement was found at Tadousac, although broken pieces of several others were recovered and are in the collection. One, a broader blade, has a longitudinal groove on its side. The Montagnais recognize these traditionally as harpoon-heads.

Hammers of several types occur—the roundish hand maul of

¹ Names in Montagnais (coast dialect) of some of the types of implements are: *cak^whi'gan*, semilunar scraper; *lamhi'gan*, ax or pounder; *patski'gan*, maul or hammer for cracking bones; *ni'o'gan*, harpoon- or lance-head; *ni'ga'k^w*, fish-spear head, smaller than the last.

² Cf. Willoughby, *Prehistoric Burial Places in Maine*, op. cit., pp. 15, 17-18.

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chert, and the disc-like pounder or cracker of porphyry (?). These are rather commonplace.

A tomahawk-like implement is represented by four specimens; these show some uniformity, with broad waists and somewhat tapering ends. They are crudely finished and may have been mounted. They are not polished, nor do they or any other objects show signs of grooves for hafting. In this feature we meet another similarity with the conditions in northern New England.¹

Several specimens were found which looked like small broken plummet-shaped objects. They are an inch or so in length and are made of stone similar to that of the chisels. Although none of the so-called plummets of the New England area came to light here, it is not at all unlikely that these may be smaller specimens of the same kind.

Finally there were absolutely no indications of pottery or stone vessels, and no evidence of bone, shell, or antler tools, nor of objects suggesting ceremonial use. There are no shell-heaps in this immediate vicinity, although such were observed eastwardly on the northern shore of the St Lawrence, at Godbout, Pointe des Monts, Trinity bay, Petite bay, and Caribou island.

Finally, another point of importance here is that a large proportion of the implements found, whether of quartzite or the hardest porphyry, were broken. In a few cases the parts found could be matched, though the fitting surfaces had become much patinated. But there must have been some wholesale breaking process at work: either the intense cold of such an exposed site or else the extreme age of the articles. Some of the chisels show extensive corrosion on one side, altogether different in appearance from the polished, protected under-side. This fact of wear and breakage by exposure should be reckoned with in studying the site. It is not as though a few things were found in a broken state: practically all the objects were in that condition. The suggestion, moreover, that this was a burial site is hardly tenable, considering the quantity and distribution of the stone refuse and unfinished material.

If this was an ancient habitation site, as the evidence so far seems to show, it must have been occupied at a time when physical conditions and the elevation were different from what they are now. My tentative interpretation of the circumstances, in view of archeological correspondences with similarly situated sites in Maine, is that we have here the vestiges of an earlier phase of Algonquian culture. This

¹ C. C. Willoughby, *The Adze and Ungrooved Axe of the New England Indians*, *American Anthropologist*, vol IX, no. 2, 1907.

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view has been expressed by the conservative writers already referred to, particularly by Dr Dixon¹ and Mr Willoughby.²

Related vestiges may be expected to crop out in various intermediate localities between southern Labrador and some point to the southward on the Atlantic coast toward where the southern terminus of the culture may have been. This area may even include the region in Burlington county, New Jersey, recently examined and reported on by Dr Hawkes and Mr Linton.³

Despite the gaps in our knowledge concerning the archeology of the East, one has a feeling of satisfaction in knowing that a problem of considerable importance in the solution of Algonquian migrations is now receiving attention and that future exploration will yield more definite results where somewhat promising beginnings have already been made.

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¹ The Early Migrations of the Indians of New England and the Maritime Provinces, *op. cit.*, pp. 13-14: "One thing seems plain at least, and that is that however they [the Abnaki] reached the region in which they were found at the time of the Discovery, they were not the first occupants of the territory about Penobscot Bay. Although the shell-heaps of this district are evidently old, and indicate a long occupation by their builders whom we may confidently associate with the Abnaki, yet the remains of the so-called Red-paint People . . . certainly antedate these shell-heaps, and would seem to point to a pre-Abnaki people. Who these were is still a matter of conjecture. There is much to favor the belief that they were affiliated with the Beothuc."

² Prehistoric Burial Places in Maine, *op. cit.*, p. 50: "The great age of the sixty or more graves described in the foregoing pages is evident. The complete decay and disappearance of the skeletons, . . . the disintegration of the firestones of pyrites, and the decomposition which many of the implements had undergone when buried many inches beneath the surface, prove the burials to be among the oldest yet discovered upon the continent."

"If the generally accepted theory of the comparatively recent eastward migration of the Algonquian tribes which inhabited New England at the advent of Europeans be correct, the burials in these old cemeteries cannot be attributed to that people." Mr Willoughby states in another paper (The Adze and the Ungrooved Axe of the New England Indians, *op. cit.*, p. 303): "Evidence is accumulating which seems to indicate that the above burials may be pre-Algonquian. A series of implements collected for the Peabody Museum during the last summer by Mr Owen Bryant at Notre Dame bay, Newfoundland, the heart of the historic Beothuk region, strengthens this theory."

³ Paper entitled "Excavation of a Pre-Lenape Site in New Jersey," read at the International Congress of Americanists, Washington, December 1915.

Portraiture in Central American Art

By HERBERT J. SPINDEN



AMONG the human beings represented in ancient Mexican and Central American art are there actual portraits of individuals? Accustomed as we are to judge the works of alien peoples in the light of Europe, hardly one of us has not been tempted to see likenesses of old-time rulers in the graven stone faces at Copan, Chichen Itza, and other Maya cities, and to catch the personality of men from the masses in the little heads of baked clay that strew the fields from Central Mexico to the lakes of Nicaragua. But mere human interest is, after all, a dangerous guide to knowledge.

Aztec Representations of Historical Persons.—The Aztecs were the ruling race when Cortés planted his flag in New Spain. While the seat of their power, in the Valley of Mexico, was somewhat outside the area of the earlier and more magnificent civilizations of Central America, nevertheless this nation must have acquired by inheritance from the preceding peoples many ideas and conventions in art. It may therefore be significant that one looks in vain for acknowledged portraits among Aztec drawings and sculptures. In the native codices, or illuminated manuscripts, and on the commemorative monuments that have come down to us, there are many references to historical personages made through the device of combining the personal hieroglyph of the individual with a conventional figure devoid of all facial and bodily peculiarities. In these representations the details of dress and ornament may vary enough to indicate rank and place of abode.

On the Stone of Tizoc, commonly called the Sacrificial Stone, the figure of Tizoc, who was war-chief of the Mexicans from 1483 to 1486, is distinguished by the personal hieroglyph. Excepting the head-dress, his costume belongs to the Aztec war-god Huitzilopochtli or to his wizard brother Tezcatlipoca. The man held prisoner by Tizoc bears the hieroglyph "little net", Matlaltzinco, and stands for an important tribe inhabiting the Valley of Toluca. This tribe was reduced by the Mexicans in the year 1478, possibly under the direct leadership of Tizoc. We have no reason to believe that an individual chief of the Matlaltzinco tribe is portrayed in the captive. In all the other pairs of figures carved on the periphery of this great drum-shaped stone the victor is the Aztec war-god (Huitzilopochtli or Tezcatlipoca),

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while the victim personifies some vassal town or province. The place-name hieroglyph is enough to make clear what town or province is meant, but Dr Seler professes to see regional differences in costume among the captives.

Both Tizoc and his successor Ahuizotl are pictured on the stone commemorative of the completion of the great temples to Huitzilopochtli and Tlaloc bearing the date Eight Reed, 1487. This sculpture is carefully executed and fairly well preserved. The two rulers stand on opposite sides of a bundle altar and each pierces his ear with a large awl made from a human femur. The sacrificial blood, flowing outward and downward in a stream, enters an "earth mouth" beneath

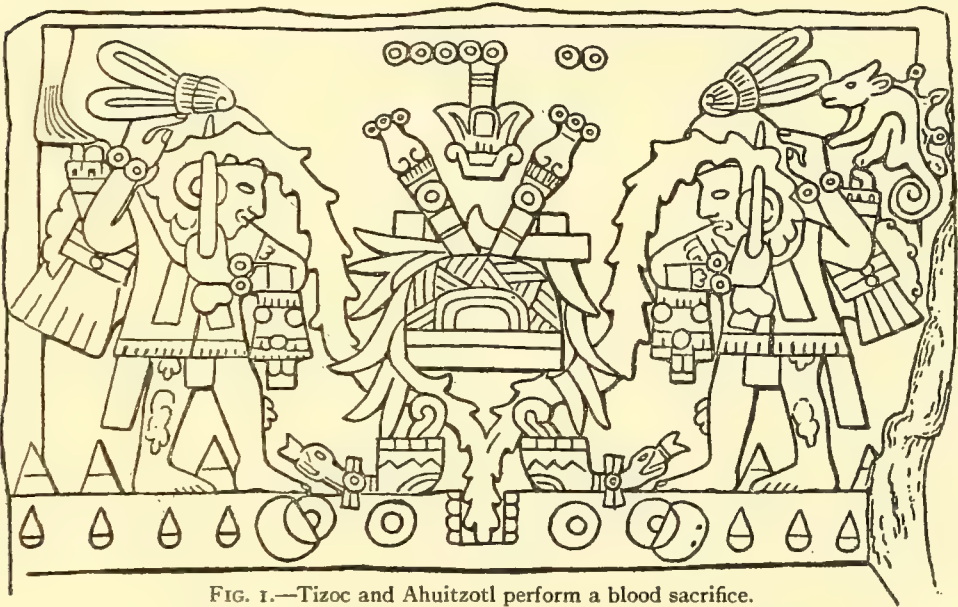


FIG. 1.—Tizoc and Ahuizotl perform a blood sacrifice.

the altar. The costumes of the two chieftains are alike. Besides the bone awl each carries a ceremonial pouch over one arm and has at his foot a serpent-headed incense burner. Again the personal hieroglyph furnishes proof of identity, and individual traits do not appear. It must be admitted that on these two monuments the conventional figures are much smaller than nature.

When we turn to the illuminated Mexican manuscripts we find the pictures of historical persons to be entirely formal except for differences in dress. Associated hieroglyphs again disclose the personality. Examples of stereotyped human beings from the Codex Telle-

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riano-Remensis are given in figures 2 and 3. The conquistadores are distinguished from the Mexicans in this record by beards as well as by dress, but Spanish facial types are not closely followed. Under the year 1541 the death of Pedro de Alvarado, called Tonatiuh, or Sun, by the Mexicans on account of his yellow hair, is recorded, as well as the baptism of the natives by the friars. The characterization is by dress and style of hair-dressing.

Ideal Portraits of Aztec Gods.—In spite of this failure to discover accredited portraits of historical personages in either the sculptures or

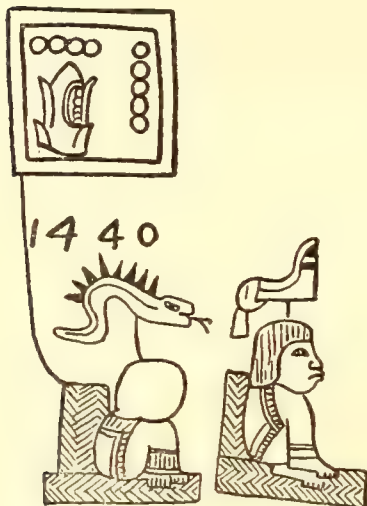


FIG. 2.—Itzcoatl dies and is succeeded by Moctezuma I. (Codex Telleriano-Remensis.)

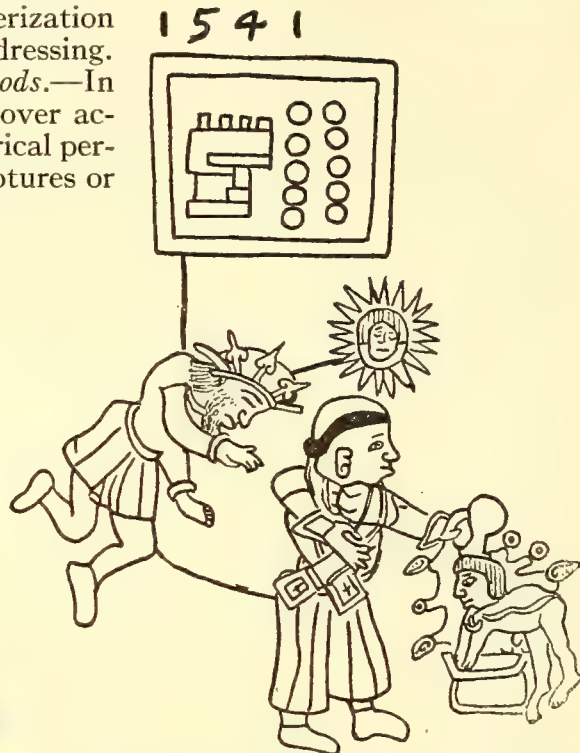


FIG. 3.—Pedro de Alvarado dies and the Spanish friars baptize native children. (Codex Telleriano-Remensis.)

the manuscripts, we must be prepared to admit that the concept of the portrait was almost if not quite realized in the faces of the greater gods. Many of the Aztec gods were, to be sure, characterized by faces so grotesque and unhuman that we cannot justly compare the gross differences in their features with the more subtle differences in contour and expression among human beings. But while such divinities as Tlaloc and Ehecatl have to be thrown out of consideration as being too little humanized, the same ruling does not hold against, for instance, Chalchiuhtlicue, Goddess of Water. She is personified as a



AZTEC GODDESS OF WATER. IDEAL AND CONVENTIONAL PORTRAIT
(American Museum of Natural History)



ARCHAIC CARICATURES FOUND IN MEXICAN GRAVES
(American Museum of Natural History)

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young woman of pleasing aspect in the two sculptures reproduced in plate I, and almost the same facial expression is achieved in both works, although the details of dress differ considerably.

Archaic Caricatures in Clay.—Many writers have commented on the fact that the pottery heads which are found in great numbers over Mexico and Central America bear the imprint of personality either by accident or by the expressed intention of the potter. Archeologists classify the heads according to periods and provinces. Much space would be required to elucidate this subject in anything like a definitive manner, and at this time only a few of the major classes of pottery heads can be touched upon.

The earliest art in clay as determined by stratified remains in the Valley of Mexico is that of the so-called Archaic Period. The thickened stratum indicates a long duration for this art and comparative study has shown that the figurines are practically homogeneous over a vast area. It seems likely that several stages will ultimately be discerned in the historical development of archaic art in Mexico and Central America before it gave way to higher forms.

Heads of the Archaic Period offer unmistakable evidence of the lack of anatomical knowledge or of ability to present this knowledge by the crude technical methods then in use. Nevertheless the heads, and in fact the entire bodies, are often strikingly effective as caricatures. The large effigy vessels found in graves may be attempts at portraiture, but portraiture so restricted by convention and ignorance that it nowhere approaches truth in form. The very naïveté of these entire figures with their large ill-shapen heads and short stumpy limbs appeals strongly to the imagination. The fact that the persons represented are often engaged in active exercise gives us additional material for rounding out a sympathetic picture. However, the writer suspects that the caricatures, even when most effective, are haphazard rather than intentional. Objectively there is considerable similarity in style between some of these first products of New World art and the fantastic figures turned out in the maudlin schools of modern sculpture. But one important difference may be noted between the first and second childhood of plastic art—the real primitives did the best they knew how. Caricature was the nearest they could come to nature, nevertheless their intention was to reproduce truth in form and habit.

The four clay figures given in plate II, probably dating from a late era of the Archaic Period, are successful attempts to express emotion by action. If these funerary effigies were intended to have a sober portrait quality, as seems most likely, then the obvious quality of

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caricature must be ascribed to overshooting the mark through crudeness in technique rather than to a frivolous and wilful exaggeration of natural characters.

Portrait Types in Clay.—We should be on our guard against too sympathetic an appreciation of the delicate bits of sculptural art in clay made after the close of the Archaic Period. The impetus toward these higher forms seems to have come from the Maya of the lowlands who began to show indubitable signs of coming greatness about the time of Christ. A remarkable increase in anatomical knowledge and in modeling skill is shown in these faces. There is also a noticeable standardization into portrait types. The extensive use of clay molds must have aided in this standardization, since pleasing products could be used as master models and the copies widely distributed.

Two Maya heads from Salvador are reproduced in plate III, *a* and *b*, and it will be noted that one example is almost the exact replica of the other. Other heads of this full-round type from the same region may be seen in the collections of the American Museum of Natural History. As a contrasting type, also well developed, *c* and *d* present two faces in rather low relief from the Toltec Period of the Valley of Mexico. How far the differences between these two types are to be explained by an actual difference in physiognomy between the natives of the two regions, the writer is not able to say. The use of these heads casts no light on the question as to whether some of them may be portraits. The Maya specimens are decorative details broken from pots, while the Toltec ones probably are parts of votive jointed dolls in which the head and torso made up a single piece. Within these types there is, of course, a certain amount of individuality, but this would inevitably occur through slips and inequalities of workmanship.

Zapotecan Funerary Urns.—The funerary urns found in Zapotecan tombs were made centuries later than the quaint funerary effigies of the Archaic Period, already described, after religion had made great advances and government had become strongly theocratic. Close connections with the best ceramic work of the Maya can easily be demonstrated. The urns proper are cylindrical vessels concealed behind elaborate figures built up from molded and modeled pieces. Many of the figures represent human beings while others have the outward features of grotesque divinities. However, it may be significant that normal human faces underlie the projecting mask-like features of the grotesque divinities (pl. IV). The idea may have been to indicate the semi-sacred character of deceased priests or nobles by the device of a divine mask.



PORTRAIT TYPES IN EARTHENWARE

a, b, Maya (Salvador); *c, d*, Toltec (Valley of Mexico); *e, f*, Zapotecan (Oaxaca)
(American Museum of Natural History)

SPINDEN—CENTRAL AMERICAN PORTRAITURE

The purely human type of figure shows a formal but life-like modeling. The faces are often out of all proportion to the rest of the body and are characteristically broad rather than high. The eyes have heavy lids and deep sockets that fill with shadow. The lips are usually parted so that the filed teeth are exposed. The upper lip is arched and curled back, while the lower one is straight. We cannot be sure that the faces on Zapotecan funerary urns are actual portraits of the dead, but there is a possibility that they were regarded as such even when fashioned after formal types. The writer has not been able to find examples of physical abnormalities which might safely be regarded as individual. The ideal portrait quality attained in the best products is well illustrated in the small and simple urns reproduced in plate III, *e* and *f*.

Laughing Faces from Vera Cruz.—The smiling or laughing faces commonly referred to the Totonacan culture of Vera Cruz are remarkable examples of free-hand modeling in clay. They were probably set into temple walls by means of tubular extensions at the back. The faces are broadened to agree with the peculiar esthetic types of a forehead-flattening people. The eyes are not so deeply set under the brow as in nature, but rather more so than in the common run of Central American products, and they sometimes have a pleasing upward tilt at the outer corners. The noses vary considerably in length, but are seldom prominent. In the modeling of the mouths there are differences which seem to be individual. One can readily believe that a master potter, using his finished art in an off-hand manner, caught the fleeting differences in smiles, gay, reluctant, and malicious, of the townspeople who crowded around him as willing models. Four examples are given in plates V and VI, and attention should be directed to the subtle but measurable differences in form that may be observed in these faces. The modeling is so consistent and coherent that every feature smiles, and unless one holds himself by sheer force of will to an objective study his eye forgets mere form while his mind sees an apotheosis of laughter.

Unusual Figurines in Clay.—While most clay heads and figurines fall into well-defined types and classes, a few have special if not individual features. In plate VII, *a*, is pictured a cripple with bulging chest and back. The head is set close to the shoulders and the single preserved arm is long and thin (this is foreshortened in the photograph). The mouth is unusually large, with thin compressed lips. The expression is so thoroughly characteristic of hunchbacks that the potter must have carefully studied the subject. Since it is unlikely that more than one hunchback would be living in an ordinary Mexican

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village, it follows that this statuette may be regarded as an individual portrait. And if real portraits were made of cripples, why not of normal persons?

In the Peabody Museum of Harvard University there are several Maya figurines that are unusual in treatment and subject matter. One represents a seated woman with a child resting in her lap. The face of the woman gives evidence of the artist's exceptional skill in shaping. On the cheeks are designs in low relief that probably represent tattooing or scarification. Now such designs are often looked upon as personal property. Whether this was true among the Maya the writer has no means of knowing. At least the presence on other clay heads, as well as on some of the more important stone sculptures, of designs that seemingly reproduce permanently bodily decoration, may indicate that individuals are being drawn to life.

An example of clay modeling that shows great freedom and skill is given in plate VII, *b*. It was found in the State of Chiapas, Mexico. The face has much individuality with its half-closed eyes, high cheekbones, large open mouth, and pointed beard. The body and dress seem to have been built up, rapidly and without retouching, out of lumps and strips of soft clay. The extended apron rests upon the ground and permits the figure securely to stand erect. We now leave the humble art of making pots and effigies in clay with our original question answered affirmatively, but in a doubtful and hesitating manner.

Mexican Art at Chichen Itza.—At Chichen Itza in northern Yucatan the temples in connection with the great Ball Court are more Mexican than Maya in decoration and probably date from the 13th century of the Christian era when Mexican overlords ruled in this ancient Maya capital. In the North Temple of the Ball Court and in the Lower Chamber of the Temple of the Jaguars the walls are decorated with low-relief sculptures showing processions of priests and warriors bearing weapons and other objects. Let us direct our attention to the human figures on the walls of the latter structure. These are lined up in five tiers and approach each other toward the center. A great plumed serpent occupies the width of two tiers, the second and third from the bottom, and above this is a warrior backed by a serpent, while in the fifth tier is an elaborate Sun Disc. The personages nearest these divine representations are most elaborately attired, even to the point of wearing masks, and they appear through the universal device of the "speech scroll" to be uttering prayers. Identifying hieroglyphs are placed over the heads of many but not all the human figures in the five tiers, and there are also considerable



ZAPOTECAN FUNERARY URN WITH GROTESQUE DETAILS OVER A
HUMAN FACE
(American Museum of Natural History)

SPINDEN—CENTRAL AMERICAN PORTRAITURE



FIG. 4.—Chichen Itza figure wearing the royal head-dress (*xuihuiatzolli*) of the Mexican highlands.

differences in dress, ornament, and objects carried.

Several explanations of these rows of human figures may be offered:

1. They may represent minor gods.
2. They may represent priests and warriors of Chichen Itza in a religious procession.
3. They may represent vassal towns and territories, possibly personified by the chief, bringing tribute to Chichen Itza.

The first of these possibilities seems least likely, because the dress and hieroglyphs differ from those of known gods in either the Maya or Mexican pantheon. It is more difficult to judge the relative merits of the second and third hypotheses. The sculptures resemble in type the historical monuments in Mexico already referred to (the Stone of Tizoc, etc.), but we have no certain means of knowing whether the hieroglyphs

stand for personal or place names. The marked differences in costume probably have a geographical significance. The faces vary somewhat in expression, but belong to a pretty definite type, characterized by a straight forehead, a Roman nose, a hard mouth, and a square chin.

At Chichen Itza there are many buildings with sculptured door-jambs and sculptured columns that are clearly contemporaneous with the Ball Court group. The drawings present in vertical panels single human figures that are almost natural size. The faces are strongly if rather crudely delineated and there is no attempt at delicate modeling. In some instances the royal head-dress of the Mexicans is shown (fig. 4), as well as Mexican types of nose ornaments. Full-bearded persons are not infrequently represented (fig. 5). Hieroglyphs are placed above the heads, and these also are Mexican in type, that is, they are realistic pictures not reduced to the rectangular outline of a Maya glyph block. Even if these faces should not prove to be veritable portraits, they at least follow a physical type quite different from that which occurs at the

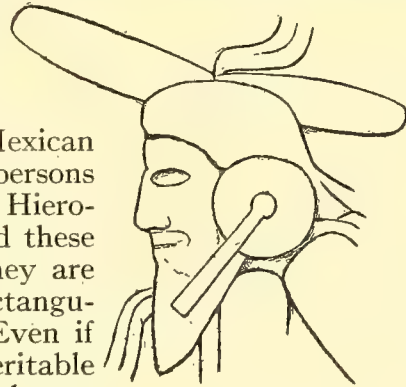


FIG. 5.—A Chichen Itza head.

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southern Maya cities and doubtless were intended to represent the foreign overlords.

Maya Sculptures of the Great Period.—The last and most important division of our subject still remains for consideration, namely, the monumental sculptures of the early Maya, dating from the Great Period (400–600 A.D.). The monuments on which human beings are represented include stelæ, altars, lintels, and mural panels. The medium is usually limestone of varying fineness, although stucco is not unknown. Of these monuments the most numerous and important are the great plinths and slabs sculptured on one or more sides, that are called stelæ. These are architectural in the sense that they beautify the approaches to temples or adorn the ceremonial centers of the ancient cities. Inscriptions that contain dates are found on most stelæ as well as on other monumental pieces. This fact has given rise to a theory that the monuments in question are primarily markers of time, and particularly of round numbers of days in the Maya notation.

Captives on Memorials of Conquest.—Judging by the graven pictures, many monuments of the southern Maya are memorials of conquest. Captives bound with rope or held by the hair are actually represented in several instances. On a still greater number of monuments the principal personage stands upon a crouched or prostrate man devoid of all signs of rank and power. Sometimes this debased figure has his arms bound and is clearly a captive, while in other cases the expression of woe upon his countenance evinces a state that is far from happy. Even when captives themselves are not shown, the shield and spear of war are seldom wanting. Now it is obvious that the presence of vassals and overlords on the monuments increases the probability that actual historical events are being commemorated and that actual historical persons are being portrayed.

The lintels and stelæ of Yaxchilan and Piedras Negras are richest in scenes that depict the triumph of war, and an examination of representative details might prove timely. Two captives seized by the hair are reproduced in plate VIII, *a* and *b*. The faces are more carefully drawn than in the majority of cases when captives are represented. While there is an undeniable feeling for individuality in the expression, there are no marks by which the portrait character can be definitely established.

Lintel 4 at Piedras Negras pictures two soldiers returning from war with booty and a captive which they present to their commanding officer. Stela 12 at the same city doubtless memorializes a conquest of importance. A richly attired war-chief on a lofty throne looks



SMILING FACES OF THE TOTONACS
(American Museum of Natural History)



a



b

SMILING FACES OF THE TOTONACS
(American Museum of Natural History)

SPINDEN—CENTRAL AMERICAN PORTRAITURE



FIG. 6.—Bound captive, Stela 5, Ixkun. (From a field sketch.)

down upon a huddled group of miserable captives, bound with rope and guarded by two standing soldiers. The captives (plate VIII, *c*) have apparently been degraded, since the customary ear-plugs have been taken from their ears, leaving the perforations clearly visible, while the hair is roughly knotted on top of their heads. Permanent body decoration, either tattoo or scarification, is seen in bead-like details across the chin, at the corner of the mouth, the base of the ear, and the tip of the nose, but all ornamental objects of dress are wanting. There is one person seated above this group of unfortunates who may be an important chief received with the honors of war. He still wears an ornamented ear-plug, a feather head-dress, a necklace, and a decorated apron.

All the human figures in this tableau, including three victors and nine victims, have short incised inscriptions upon their bodies or near their heads. These inscriptions consist of two or more glyphs, and it seems reasonable to suppose that names of both persons and places are recorded. The head of a bat (Zotz) with a knotted prefix (fig. 7) begins most incised inscriptions on this and other monuments at Piedras Negras, and indeed at most Maya cities in the Peten region. This glyph may have some such general meaning as "here follows a name".

The faces of the captives wear expressions of fear and sullen anger. The profiles



FIG. 7.—Zotz glyph.

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are varied for all cases, but the most marked individuality is seen in the downcast old man at the observer's right, and in the heavily bearded person who sits next to him. Drawings of captives from other cities emphasize the intention to degrade these unfortunates, and by contrast to emphasize the beauty and splendor of the victors.

The Principal Personages.—We have seen that miserable and disheveled captives are treated with crude realism. But does this realism ever manifest itself in the treatment of principal subjects? As a general rule the principal subjects are characterized by dignity, repose, and conventional beauty. At Tikal, however, there is a human representation with a torso so aldermanic in its development that no one can pretend it was carved thus for esthetic effect. This is on the underside of Lintel 2, Temple III. The beams of zapote wood are still in position, but the sculptured surface is in such an advanced state of decay that no drawing of it has ever been published and only a rough sketch (fig. 8) can be given at this time. On Lintel 1 at La Mar is drawn a chieftain whose bodily proportions are somewhat gross, and the same may be said of the figure on Stela 35 at Piedras Negras.

But portraiture, if attempted at all, must ordinarily have been expressed in the face. The examples of bodily peculiarities already noted serve to strengthen the probability that the apparent facial peculiarities of exalted personages on stelæ, etc., may be regarded as intentionally realistic. Something analogous to the portrait types in pottery must be noted in the stone sculptures. Each city has usually a favorite type that can easily be distinguished from the favorite type of another city, and yet there is always a considerable play for individuality within the type. In the fixing of facial types for each city, we should not fail to consider duly the faces which occur in



FIG. 8.—Sketch of figure on Lintel 2, Temple III, Tikal.



FIGURINE REPRESENTING A DWARF
(American Museum of Natural History)

MAYA FIGURINE FROM CHIAPAS
(American Museum of Natural History)



CAPTIVES ON MAYA MONUMENTS

(a, Lintel 45, Yaxchilan; b, Stela 15, Yaxchilan; c, Stela 12, Piedras Negras)

SPINDEN—CENTRAL AMERICAN PORTRAITURE

hieroglyphic inscriptions, as well as those which serve as supplementary ornament on the bodies of the heroic figures.

Front View and Full-round Sculptures.—It seems best first to examine cases of presentation in front view and in the full round, and then to turn our attention to the more usual profile studies. The writer has elsewhere been able to show that the earliest stelæ at Copan were given over to low-relief front-view presentation, but that this rapidly developed into high relief and the full round. It may be stated as a general truth that the front view of the human face finds its happiest expression in high relief or the full round, and that in contrast the profile view is most fittingly given in low relief. The front-view presentation may be studied to advantage at Copan, Quirigua, and Piedras Negras.

The earliest Copan examples are archaic and show protruding eyes, block-like faces, and other defects that are remedied in later pieces. The best-preserved of the early monuments is Stela P, dating from about 350 A.D. An excellent example of the work that was done 150 years afterward is seen in Stela H, while Stelæ 5 and N are intermediate products (pl. IX, *a-d*). It may be noted that the proportions of the body are better in the earlier than in the later work, but that the carving of the face indicates the true course of historic change. Close examination of the faces on Copan stelæ shows differences in the form of features and in expression. Some details, like the eye, develop in a way that is capable of demonstration, but the variation in other details may be intended to reproduce the peculiarities of individuals. Beards are shown on a number of the latest figures, including one of the two on Stela C.

Perhaps the finest sculptured pieces at Copan are the full-round figures used as frieze decorations on temple fronts. A famous example discovered by Maudslay and labeled a "singing girl" is reproduced in plate X, together with an unusually fine head now in the Peabody Museum of Harvard University. It seems likely that both these heads represent the youthful and beautiful Maize God. At this point it may be stated that sex differences appear mostly in dress and that there are no nudes in ancient Maya art. Women are distinguished by a sack-like garment that covers the body and conceals the modeling of the breasts. Stela H at Copan, already referred to, probably represents a woman, since the skirt reaches nearly to the ankles. Stela K at Quirigua is sometimes called "the queen", but the costume is that of a man. Long-skirted persons are represented on several monuments at Naranjo and Yaxchilan. Reverting to the two heads that probably picture the Maize God, there is no reason why actual persons noted for their beauty should not have served as models.

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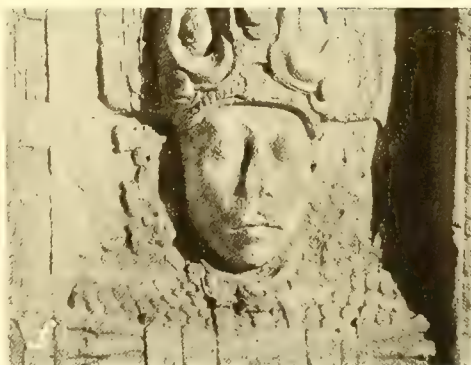
At Quirigua the most striking face is that on the north side of Stela E. Beards are represented on more than half the human beings at this city (pl. IX, *e*). At neither Copan nor Quirigua has the writer been able to find certain proof of portraiture, although all artists declare that the faces in stone could not have been carved except from living models.

There is an interesting series of monuments at Piedras Negras, consisting of Stelæ 25, 6, 11, and 14, in the order given. All present a human being seated cross-legged upon a gorgeous throne canopied by the signs of heaven. A line of footprints up the front of each throne may signify the ascension to the seat of theocratic power of the person portrayed. The dates show intervals of 80, 45, and 60 years. The face of the earliest monument is badly damaged, but those of the succeeding ones are excellently preserved and have much character (see pl. IX, *f*).

The Profile-view Sculptures.—In the earliest sculptures of the Maya the face is represented in profile and the body in either profile or front view. The profile presentation is, in fact, much more common than the front view. This is not to be wondered at, since it is effective when the relief is low and the labor of stone-cutting reduced to a minimum. Space considerations limit us to the examination of a few contrasting products.

A head form so common at Palenque that it has come to be known as the Palenque type deserves attention. It offers evidence of artificial flattening of the forehead, and possibly of the occiput, and a consequent lifting up of the peaked crown. The nose is prominent, with a high bridge, a convex profile, and a drooping tip. The mouth is often slightly open. The upper lip is short and arched, but the lower one is full, protruding, and pendulous. Although the jaw is ordinarily heavy, the chin is rounded and retreating. Such a type of face would seem to give little hope of an esthetic treatment, yet an astonishing amount of dignity and grace is found in the low-relief profile figures, modeled in stucco or carved in stone, that adorn the temples of Palenque. A number of faces showing the wide range of variation within the limits of this type are sketched in outline (fig. 9).

At Yaxchilan the heads and faces show considerable likeness to the Palenque type, but are not so extreme. The eyes are often large, with heavy drooping upper lids. Careful study brings out many differences in the modeling of eyes as well as in the outlining of nose and brow. As a rule the supraorbital ridge is prominent. The admirably preserved upper portion of Lintel 26 (see pl. XI, *a*) represents a



MAYA SCULPTURES IN THE FULL ROUND

a, Stela 9, Copan; *b*, Stela 5, Copan; *c*, Stela N, Copan; *d*, Stela H, Copan; *e*, Stela D, Quirigua; *f*, Stela 6, Piedras Negras)

SPINDEN—CENTRAL AMERICAN PORTRAITURE

man and a woman, the former with left hand extended toward a jaguar head which the latter holds against her breast. The relief for



FIG. 9.—The Palenque type. (*a* to *h*, Palenque; *i*, Chicozapote.)

the blocked-out masses is rather high, while that for details of dress and contours of the body within these masses is low. The tips of the noses are markedly undercut, so that a vivid contrast against the

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sunken background is achieved. The cheek and mouth of the woman bear ornamentation in tattoo. In the next illustration (*b*), taken from Lintel 3, the expression of the face is considerably altered by the change in eye and brow. The eye is given a bulging quality by the incised outline of the heavy upper lid that parallels the profile of the face above the bridge of the nose. The second figure on this lintel has a face of much more rugged outline. The two subjects on Lintel 42 (pl. XI, *c*) make a contrast of individualities even though both are drawn with the same conventions. The man at the observer's right is possibly a priest of war, as he holds out a Manikin Scepter that may in this instance be an elaborate battle ax. The person who faces him carries a shield in one hand and in the other a battle ax, or celt, of serviceable pattern. The face of this second subject is notably youthful in appearance. An incipient mustache is faintly traced upon

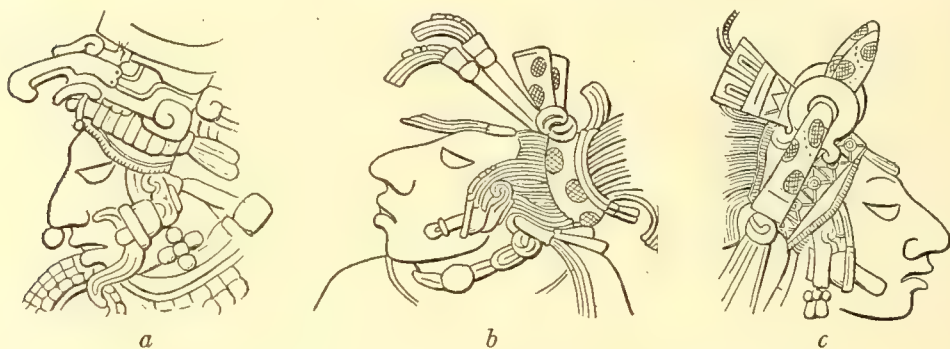
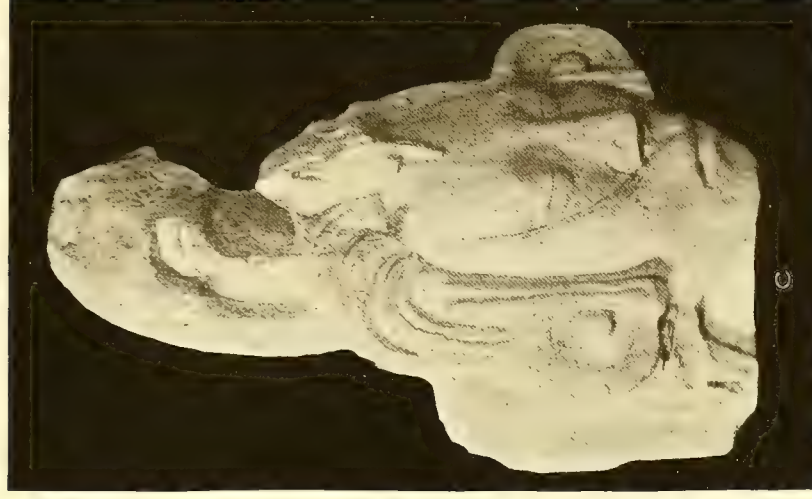


FIG. 10.—Faces on Yaxchilan lintels. (*a*, Lintel 2; *b*, Lintel 15; *c*, Lintel 41.)

the upper lip, and the lower one is less pendulous than is that of his companion. In figure 10 the drawings picture a man (*a*) and two women (*b* and *c*) with lines of great delicacy and precision. The women have softer features and a lock of hair that falls down over the forehead. From this survey it appears that heads of the Palenque type have little in common except the flattened forehead and the modification of the face that results directly from this.

The Final Products of the Great Period.—At Seibal, sometimes called Sastanquiqui, the principal Maya ruin on the Rio de la Pasion, there are several well-preserved sculptures in low relief upon great slabs of fine-grained limestone. They are among the finest products of Maya art and date from the end of the Great Period. Of special interest to us in our present quest are Stelæ 8 to 11, opposite the four sides of a temple mound in the principal plaza of this forest-covered



HEADS OF THE MAIZE GOD, COPAN
(*a, b*, South Kensington Museum; *c*, Peabody Museum of American Archaeology and Ethnology)

SPINDEN—CENTRAL AMERICAN PORTRAITURE

city. These coördinated monuments all bear the same date, 5 Ahau 3 Kayab, which on Stela 11 is declared to occupy the position 10.1.0.0.0 in Maya chronology (equivalent to about 575 A.D.). The technique of the carving is the same for the entire group. The single subjects are presented in profile and treated in low, flat relief, with an overplay of delicately modeled and incised detail. The personage on Stela 8 wears mittens and shoes made of jaguar feet and holds out a grotesque head in his right hand. On Stelæ 9 and 10 a late variant of the Ceremonial Bar is carried in both arms, and on Stela 11 a club is grasped in the left hand while seed is scattered from the right. Under the feet of the last figure a prostrate captive can still be made out. At other Maya cities "wearers of jaguar claws" and "carriers of ceremonial bars" are so frequently represented that we may pre-



FIG. 11.—Seibal faces. (*a*, Stela 8; *b*, Stela 9; *c*, Stela 10.)

sume them to have been generally recognized officers, perhaps of shamanistic character. The warrior chief in the dual aspects—benign and militaristic—of "scatterer of seeds" and "wielder of the war-club" serves as subject for many sculptures, although the two aspects are not often indicated at one and the same time as here. The four leading men in the sacerdotal and governmental circles of Seibal may well be represented in this series of sculptures.

When we compare the faces on the four correlated monuments we find a wide range of differentiation in the group as a whole and in each face a compelling individuality. The face on Stela 8 (fig. 11, *a*) is partially concealed by a strap that passes under the eye and over the nose, and by a long scroll-like object that swings downward over the cheek and forward under the chin. The mouth is closed and straight. The rather thin lips combine with the retreating chin to

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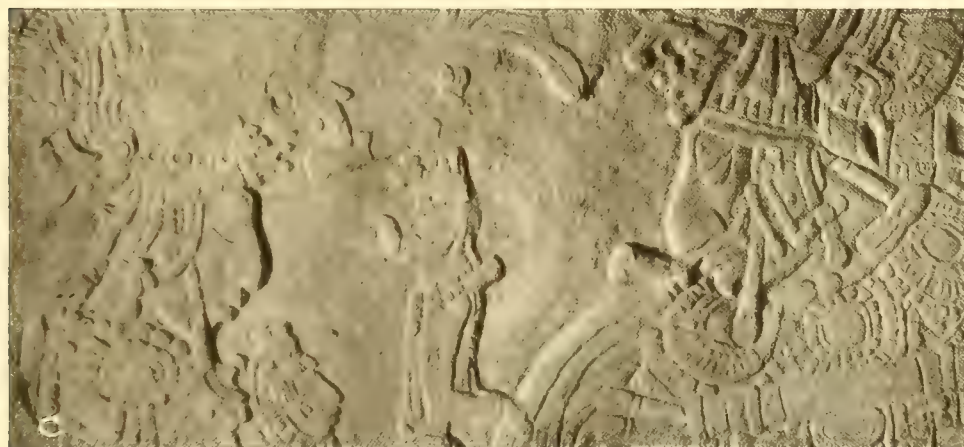
form an unusual profile. On Stela 9 (fig. 11, *b*) the nose, and in fact the whole face, is long. The type is youthful. On Stela 10 the face is full, the nose short and thick, and the eye much rounder than in the



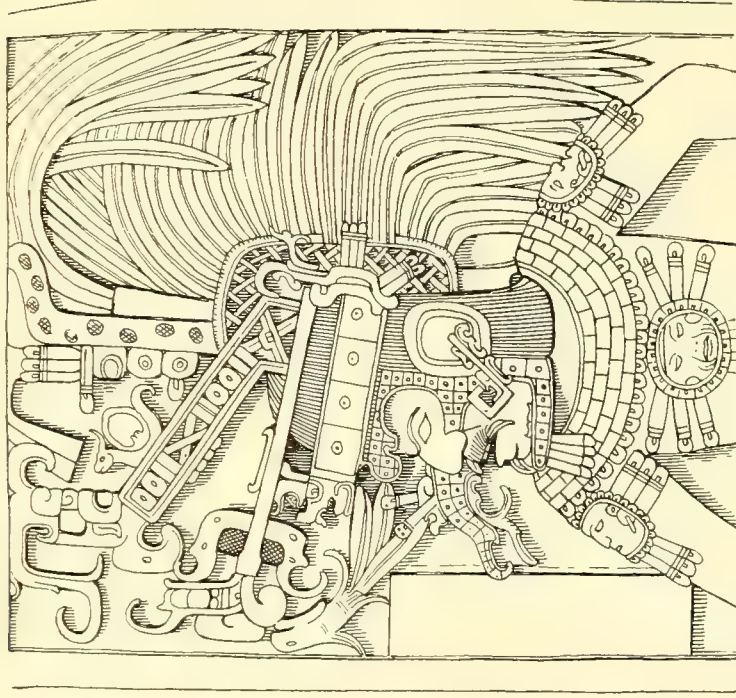
FIG. 12.—Head on Stela 1 at Seibal.

previous instances, while a mustache and imperial adorn the upper and lower lips. All in all the face wears a complacent and benevolent expression. The face of the warrior on Stela 11 evinces a very different spirit (pl. XII). The sturdy and somewhat ferocious countenance on this last monument of the group is partially concealed behind a mask of the Long-nosed God. It is not unlikely that one of the rare and beautiful masks made of precious stones set in mosaic over a wooden base is here delineated. The warrior wears a mustache and imperial, and has heavy eyebrows and a cleft in his chin. In short, all these sculptures create the effect of true portraiture. The hieroglyphs on this series of monuments are few in number, and whether name-glyphs occur among them cannot be stated with assurance.

The indefinable feeling that we are gazing upon the sculptured presentment of a dead ruler is still stronger in the case of Stela 1 at Seibal. This splendid monument, characterized by ultimate simplicity of highest art, shows us a man of flesh and soul, with a face both strong and beautiful. The date is almost surely 10.2.0.0.0, 3 Ahau 3 Ceh, the latest found at any of the great southern cities. This monument may justly be called a valedictory effort of the first and most wonderful civilization of the ancient Maya, the civilization that gave to the world so many strangely beautiful products of art in stone overcast with an ineffable spirit of religion. But if we are justified in seeing a genuine portrait in this supreme example, then we may be reasonably sure that many other sculptures from Mexico and Central America are, on the basis of intention if not of achievement, to be classed as portraits.



FACES ON YAXCHILAN LINTELS
(a, Lintel 26; b, Lintel 3; c, Lintel 42)



STELA 11, SEIBAL.

Terms of Relationship in Timucua

By JOHN R. SWANTON



THE Timucua Indians occupied the northern part of peninsular Florida and a small section of what is now the state of Georgia. On the Atlantic coast they extended from St Andrews sound to a point somewhat northward from Cape Cañaveral and on the coast of the Gulf of Mexico from Ocilla river to Tampa bay. While their language, as preserved to us by the Franciscan missionaries Pareja and Mouilla, shows a number of striking resemblances, in both structure and vocabulary, to the languages of the Muskogean stock, the greater part of the vocabulary is so divergent that it will be best for the present to continue to classify it as entirely independent. These people were divided into seven or more distinct tribes, each ruled by a head chief with subordinate chiefs in the different towns under him. The chiefs and their families were highly regarded and, as nearly as can be determined, formed a kind of superior caste. In fact, if we are to take Pareja literally, there were several different orders of privileged classes.

For our information regarding the social organization of the Timucua we are almost entirely dependent on the material contained in the *Cathecismo* of Father Pareja (pp. 107-130). A slight study and a partial translation of this were made by the late Dr A. S. Gatschet, of the Bureau of American Ethnology, who published his results in the *Proceedings of the American Philosophical Society of Philadelphia* (vols. XVI-XVIII), but his work is marred by some unfortunate mistranslations, particularly the rendering of *sobrino* as "cousin".

In conjunction with the aristocratic system to which allusion has already been made, there was a system of totemic clans gathered into several phratries. At least such is the most probable construction to be placed on Pareja's attempted description. Descent was matrilineal. In this particular, therefore, the Timucua resembled the Creeks rather than the western Muskogean such as the Choctaw and Chickasaw.

Terms of relationship may be simple stem words or they may be descriptive expressions compounded of such words, and one of the pitfalls into which the investigator among primitive peoples is in danger of tumbling is the obtaining of a descriptive expression where

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a simpler term actually existed. Inasmuch as the relationship categories of peoples differ, the terms are bound to differ also, and a relation for which one people uses a root word will be covered by another by means of a descriptive term. In attempting to find equivalents for the terms used by his own people an investigator may therefore obtain and transmit a false impression of the ideas regarding relationship of the people under consideration. For this reason we cannot in the present instance be perfectly sure of the correctness of the data on which we have to depend, yet it must be remembered that Pareja lived among the Florida Indians for many years and made a close study of their language; and it must also be kept in mind that for use in the confessional accurate information regarding relationship was of exceptional importance, so that on the whole I think we may feel that we have a fairly accurate record of the terminology employed.

Following is a list of the terms arranged under stem words:

Isa. This is the root word for "mother", *isona*, my mother; *isaya*, your mother. Mother's sister is *isale* (*isalena*, my maternal aunt), the derivation of which from *isa* is obvious. It is probable, from analogy with other languages, that *-le* is a diminutive ending, but of that I am not certain. If the maternal aunt was older than the mother she was called *isamiso*; if younger, *isa quianima*.

Iquine. This name with the appropriate pronominal suffixes (*iquinena*, she who gave me milk; *iquineye*, she who gave thee milk) was applied to the mother after her death.

Iti; the root word for "father", *itina*, my father; *itaye*, thy father. The name for the paternal uncle was compounded from this by suffixing *-le* (*itele*) as in the case of the maternal aunt. And in an analogous manner *itemiso* was used to designate the paternal uncle older than the father, and *itequiani* the paternal uncle younger than the father.

Siginona or *sisiqisama*, "the one who begot me", is the name by which the father was called after his death.

Naribuana, "my old man"; a name given to the paternal uncle after his death.

Neba; the stem word for the maternal uncle; *nebena*, my maternal uncle. *Nebua nebemima* signifies my uncle's uncle, and *nebapatani*, my uncle's wife.

Nibe; the equivalent for the paternal aunt; *nibina*, my paternal aunt. The resemblance between this word and the preceding is striking, and there may have been a genetic connection between them, but in Pareja's time, at least, there was an actual distinction.

Hue sipire, *hue asire*; a name given to the second stepfather.

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Nibira. This was applied to the grandmother on either side, and also, it is said, to the stepmother and godmother, though the last was, of course, a Christian usage. The connection of this term with that for father's sister is apparent, and it becomes still more evident when we consider the analogous case presented by the word for grandfather. The same resemblance exists down to the present day in Creek. Other terms founded on *nibira* were: *nibira yache* (also *isa yache*), great-grandmother; *nibira-yachemulu*, great-great-grandmother. The term *nibira* was also given to the mother, the maternal aunt, and the paternal aunt after the father's death.

Yachemulecoco; a term for the great-grandmother on both the father's and the mother's side.

Itora. This was the term for grandfather, corresponding to *nibira*, and it was used in an analogous manner for father-in-law and godfather. There is little doubt, especially when we consider the term for grandmother, that this word was based on that for father, *iti*. *Itora naribua*, or *coesa itora*, was great-grandfather, and *itora mulu*, great-great-grandfather. *Itora* was also applied by a woman to the husband of her aunt. In a manner analogous to the use of *nibira* it was given by children to their father, his brothers, and their mother's brothers, after the death of their mother.

Hiosa; one of the terms used by a man for his elder brother, and for the elder son of his father's brother and his mother's sister; the women of the Timucua tribe (Utina) also used this for their elder brother. Children called each other by this term after the death of either parent. Two chiefs who were brothers or of equal rank were also so called.

Niha; another term for elder brother, used by men and by Timucua women in the same manner as *hiosa*, also for the son of the father's brother older than self.

Ano ecoyana; the name which a man gave to his elder brother after the latter's death.

Yacha. This seems to have been applied originally by a man to his sisters, but in Pareja's time it had come to be used somewhat irregularly, or rather its use had been extended. *Yacha miso* was the term applied by a man to his elder sister and the elder daughter of the father's brother and the mother's sister. *Yacha quianima* was the term which a man gave to his younger brother and his younger sister, also to the corresponding cousins; the younger sister was also called *amitina*. In one place it is said that a woman so called her elder sister, but there seems to be an error in the original text at this point. *Yachimale* was used for the male and female children of brothers when spoken of collectively; *yachimalema*, sister and brother.

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Nihona. This was applied to the elder sister of a woman and is evidently related to *niha* (see above).

Poi; the usual term applied by a woman to her brother; *poyna misoma*, my elder brother, *poyna quianima*, my younger brother.

Amita; the name which a man gave to his younger brother and sister, also to the younger child of his father's brother and his mother's sister; *amitina*, my younger brother or sister. A woman called her younger sister *amita oroco*; in the Potano and Icafi dialects the forms were *amita chitima* and *amita chirico*.

Anta. In the Timucua dialect a man used this term for his brother and a woman used it for her sister; *antina*, my brother (or sister).

Yubuaribana; the name which a man gave to his younger brother after the latter's death.

Ama; a male or female child of the father's sister.

Egeta, equeta; a male or female child of the father's sister.

Aruqui; a male or female child of the father's sister.

Qui; stem of the word used for "child", whether male or female, by men and by men only; *quiena*, my child; *qiena miso*, my older child; *quyanima*, my younger child; *quiani cocoma*, or *yubuacoli*, my last or latest child. A man also gave this name to the child of his mother's brother.

Pacanoqua; the intermediate child, child born between others.

Yubuacoli; the last child (man or woman speaking).

Isicora, isinahoma; the very last child (of man or woman).

Ule; the name given by a woman to her male or female child; *ulena*, my child; *ulena miso*, my elder child; *ulena pacanoquana*, my second child; *ulena quianima*, my younger child; *ulena quianicocoma*, my fourth child; *ulena yubacoli*, *ulena usicora*, my very last child. This name was also given by a woman to her sister's child and by a stepmother to her stepchild.

Ano nihanibama; the name given by a woman to her sister's son after his death; *ano nihanema*, the name given by her to the child of the preceding after his death.

Aymantanica. This term was also applied to the sister's son after his death; *aymantana* was a name given to the deceased son of the preceding, and also by both sexes to a deceased near relative dearly beloved; *aymanino neletema* was applied to a dearly beloved deceased chief by both men and women.

Chirico. *Chirico viro* and *chirico nia* were terms used by either parent in speaking of the son and daughter respectively.

Ahono. *Ahono viro* and *ahono nia* were used like the terms just given, but it is said that they were "more used in the interior" by

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men. We find the following additional examples: *ahono viro misoma*, my elder son; *ahono nia misoma*, my elder daughter; *ahono viro pacanoqua*, my intermediate son; *ahono nia pacanoqua*, my intermediate daughter; *ahono viro quianima*, my younger son; *ahono viro iubuacoli*, *ahono viro quianicocoma*, my youngest or last son; *ahono nia iubuacoli*, *ahono nia quianicocoma*, my youngest or last daughter; *ahono viro isicora*, *ahono chirico*, *ahono isinahoma*, my very last son.

Coni; nephew, niece, the term used by a man for his sister's child; *conina*, my nephew or niece.

Ebo, *ewo*; nephew, niece, the term used by a woman for her brother's child, and also for her mother's brother's child; *ebona* or *ewona*, my nephew or niece.

Anetana ano etana was applied by a woman to her brother's son after his death (-*na* = my).

Quisito. *Quisitomale* signifies "the grandson and the grandfather", therefore *quisito* was probably the stem of the word for grandchild. It is perhaps related to the term *quisotimi* or *quisotina* given sometimes to the father's sister's child, and to a stepchild of either sex, and to "third cousins". The term for brother's wife and sister's husband very much resembles it, but we can hardly suppose the resemblance anything more than accidental.

Inihi; the term usually employed for wife. Husband and wife were known as *inihimale*.

Inifa; the term usually employed for husband.

Taca. This was used for husband and wife. Probably this term and the above were not those applied by the married pair themselves.

Taft. This simple term seems to have been applied by a man to his brother's wife; *tafimitana* was applied by a woman to her husband's brother. The ending -*na* is probably the pronominal suffix of the first person. -*mita* appears to be some sort of reciprocal, used particularly with "in-law" terms of relationship.

Iquilnona; a term give by a man to his wife's sister's husband.

Yame. This was given by a man to his sister's husband, and probably by a woman to her sister's husband also; perhaps also by a man to his wife's brother. In the Timucua dialect it assumed the form *yamancha* or *yamanchu*. *Yamemitana* was the reciprocal term given by a man to his wife's sister.

Quisa. *Niquisa*, "my (w.s.) brother's wife", *niquisimitana*, "my husband's sister".

Nasi; the term applied by a man or a woman to his or her son-in-law; also the name given to the husband of a niece, a brother's daughter in the case of a man and a sister's daughter in the case of

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a woman; *nasina*, my son-in-law; *nasimitana*, my father-in-law or mother-in-law; *nasimitamima*, his or her father-in-law or mother-in-law; this was also used by a man or woman.

Nubo, nubuo; the term given by a man or woman to his or her daughter-in-law, also to the wife of the nephew, the brother's son in the case of a man and the sister's son in the case of a woman; *nubona*, or *nubuona*, my daughter-in-law. *Nubuomitana, nynubemitama, ninubuomitama*, my father-in-law or my mother-in-law, a reciprocal term employed by women.

Yache pacano; the name given to a mother without children or kindred (cf. *yacha*).

Yachema; the mother of a girl who had just reached maturity (?).

Piliqua. This term was applied by a parent and by the mother's sister and the father's brother to his or her children after the death of the other parent; the children also called each other by this term under such circumstances. It was also used in general for any child without father or mother or without a relative.

Pareja adds the following more general terms:

Ano virona, elapachana; names by which relatives and brothers and sisters called each other.

Anoniamale, elapachamale; brothers and sisters, and male and female kinsmen so addressed each other.

Elepacha, anomalema, ano oquomi, ano oquo malema; all these indicate common relationship.

Ubua; the name given to a widow or widower by all the relatives of the deceased.

Ocorotasiqino; a name given to all of those descended from two lineages, i.e., from two clans.

Siqita pahana, all of those descended from one lineage or parentage, if it was in the male line.

Ano quela. This appears to have been the term applied to a fellow clansman or clanswoman, or perhaps to anyone who belonged to the same phratry. Pareja has *ano quelana*, or *anona*, "my relative", which he says "covers those of the same house, lineage, or parent by the female side"; *ano quela niyahobale*, we are of one lineage, caste, or generation; *ano quela chichaquene?* Of what lineage are you?

Ucucanimi; indicates distant relationship.

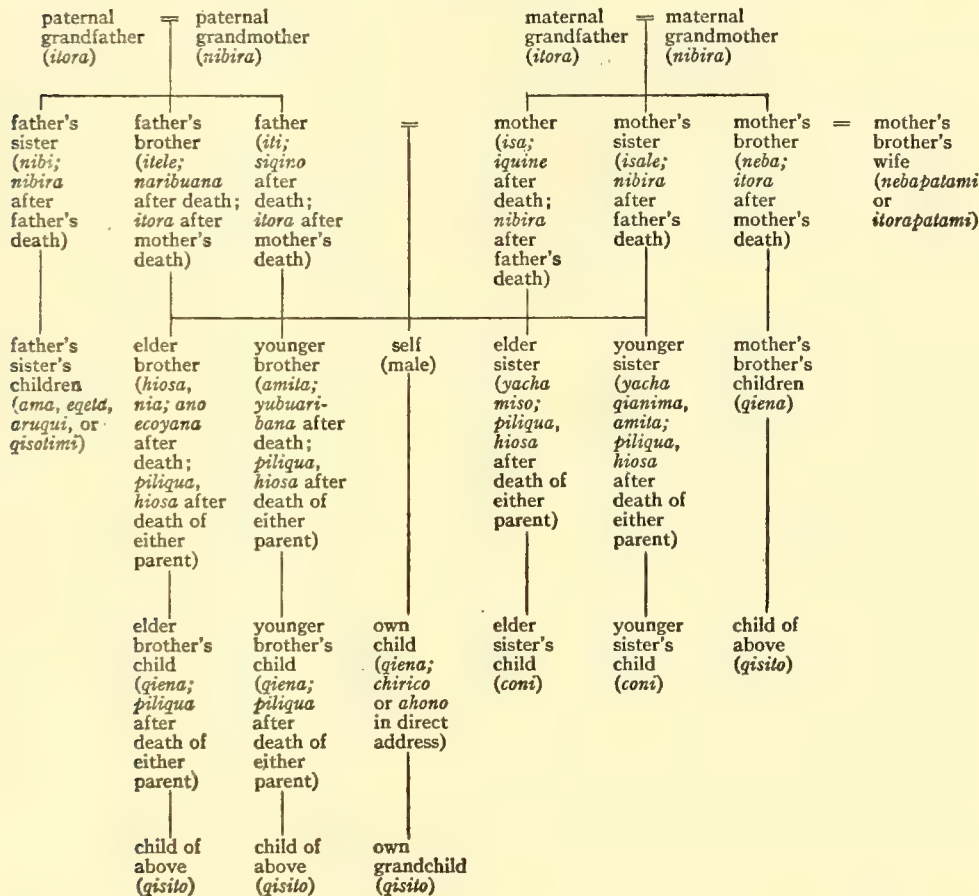
Paha nocoromale, those who are of one house; *paha niocorolebale*, we are all of one house.

Hica nocoromale, those who are of one town; *hica niahobale, hica nicorobale*, we are all of one town.

Uti nocoromale, those who are natives of, or of, one country.

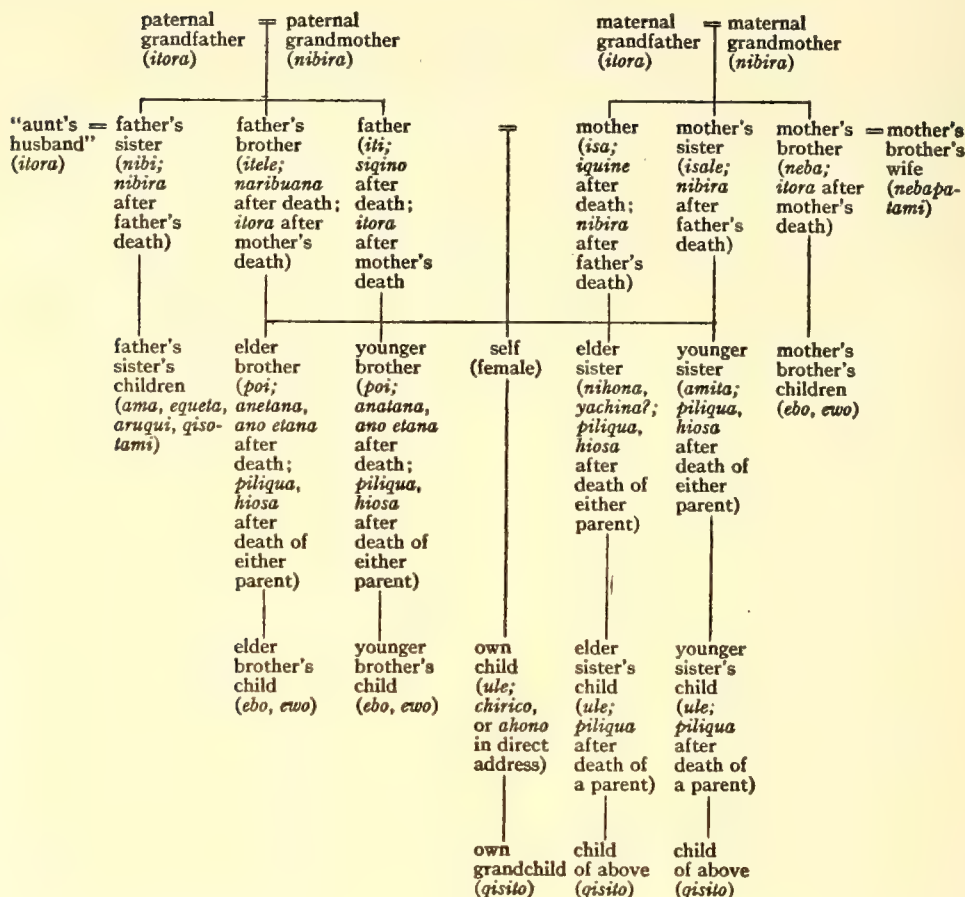
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Leaving out of consideration certain very general and certain very special terms which need not concern us, the Timucua system may be expressed by the accompanying tables.



On analyzing these terms with reference to the factors which they express, we find that sex is distinguished in the first three generations only except in relations brought about by marriage. Thus the grandfather and grandmother are distinguished, the father's sister is distinguished from the father and the father's brother, and the mother's brother from the mother and the mother's sister; the brother and male cousins associated with the brother are distinguished from the sister and the female cousins associated with her, the sons-in-law have a distinct name from the daughters-in-law, and the sisters-in-law and

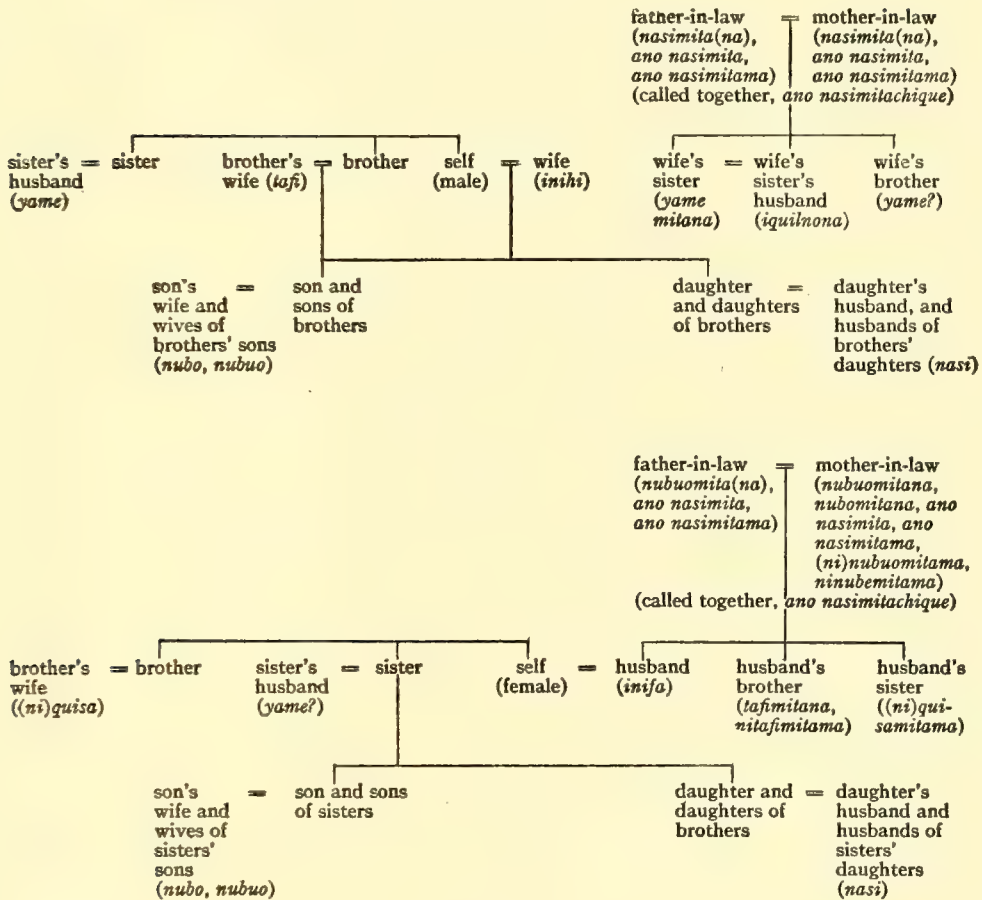
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brothers-in-law are also discriminated. Sex is not distinguished between the father's sister's children, the mother's brother's children, the children, the brother's children, the sister's children, and the grandchildren, nor does it come out clearly as between father-in-law and mother-in-law.

Relative age is distinguished between brothers and sisters, and many other terms seem to mark differences in age also, but the attempt has been to indicate succession rather than age and all kinds of reversals of the expected could easily take place. Thus the term which usually applied to the grandfather was given by a woman to her aunt's husband, and, with a modification, to the mother's brother's wife by persons of both sexes. Some of these might very well have been younger than the speaker. The same might have held true of

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the father's brother and mother's brother who—after the mother's death—were known by the same name as the grandfather. The word for grandmother was also given to the mother, the father's sister, and the mother's sister after the father's death, and among the aunts some might well have been younger than self. Similarly some of the children of brothers and sisters who belonged theoretically to the generation succeeding self might very well have been younger than self, and this was still more likely to be the case with the mother's brother's children and grandchildren who were called by names belonging properly to the two generations succeeding self and yet were actually of two distinct generations. There were also possibilities of reversion in the cases of relationships through marriage.

A word should now be said regarding the post-mortem relationship

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terms which seem to have taken on a particularly vigorous development in Timucua. These are of two kinds—names given to deceased relatives directly, and names given to persons related to self through the deceased person. Of the former we find names for the father, mother, father's brother, and elder and younger brother. It is probable that the list is incomplete and that there were similar names for the mother's sister and own sister. Of the second kind of post-mortem nomenclature we have the following: a name for the father, father's brother, and mother's brother after the mother's death; a name for the mother, father's sister, and mother's sister after the father's death; names for the brother and sister after the death of either parent; a name for a man's brother's children after the death of either parent, and a name for a woman's sister's children after the death of either parent. The first set of names seems to be purely descriptive. *Piliqua*, the principal term employed by brothers and sisters to each other and to their children, is probably a Timucua equivalent for "orphan". The term applied to the father and uncles after the mother's death is identical with that for grandfather, and the term applied to the mother and aunts after the death of the father is identical with that for grandmother. It would seem as if the breaking of this link were thought to have forced the other relatives of the same generation one generation back.

While there were very few terms of relationship that were absolutely reciprocal, it is evident that *yame* and *yamemitana*, *tafi* and *tafimitana*, *nubo* and *nubomitana*, *nasi* and *nasimitana*, which indicated relationships through marriage, were really such. Unfortunately, while the usage of the two last sets is apparent, that of the others is by no means clear.

The evident connection between the terms used for the father and grandfather and those employed for father's sister and grandmother deserves notice. In Creek the second of these associations is carried further, the names for grandmother and for father's sister being identical. The striking resemblance between the terms for father's sister and mother's brother is also worthy of attention and can scarcely have been due to chance. Possibly some connection exists between the stem *qisito*, signifying grandchild, and *qisotimi*, one of the terms for father's sister's child. *Qiena*, the male term for "child", may have some connection with *qianima*, "younger", which appears in such a compound as *yacha qianima*, younger sister.

From definite statements of Pareja we know that the Timucua were divided into totemic clans with matrilineal descent, and hence we may feel sure that many of the terms of relationship above given

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were so extended as to include sets of persons related by clan but not necessarily by blood. Had we complete information we should find without doubt that the term for father's brother extended to all the older men of the father's clan, that the term for father's sister extended to all the older women of the father's clan, the term for mother's sister to all the older women of the speaker's clan, and the term for mother's brother to all the older men of the same clan. Similar wide extensions would also be found probably in other terms, such as those for brother and sister, child, brother's (or sister's) child, and in some of the terms due to marriage, like brother-in-law, sister-in-law, son-in-law, and daughter-in-law. Certain extensions are indeed indicated by Pareja and have been incorporated into the tables, and we may confidently assume them in many other cases. Yet, if Pareja is to be relied upon, so many terms extended across clan lines that only seven at the most connoted groups confined strictly within clan boundaries. These were the terms for father's brother, father's sister, father's sister's child, mother's sister, mother's brother, wife's (or husband's) brother, and wife's (or husband's) sister. This would be true of the last two, however, only in case the men and women so designated were the men and women of the wife's or husband's clan. If they were the men and women whom the wife or husband *called* brother and sister, they might include members of every clan in the tribe. The various terms for brother and sister were applied to all those whose fathers the speaker called father or father's brother and to all those whose mothers the speaker called mother or mother's sister. Of course, those related through their mothers were actually members of the same clan, but those related through their fathers would be such only if their fathers had married women belonging to that clan. Pareja seems to record six phratries, and there appears to be no good reason why four or five brothers might not have married into all of these except their own and perhaps that of their father, so that their children would belong to four or more. Nevertheless, in accordance with the Timucua terminology those children would be brothers and sisters to one another. But if anything were lacking in the way of distribution of blood among the clans in this generation, it would be supplied in the next. There a man called "my child" his own child and anyone whose father he called elder brother or younger brother, and as well anyone whose father he called maternal uncle. So far as we know the maternal uncles could marry into any phratry outside of their own, except perhaps that of their father, and the same was true of the other males in this group, whose mothers, as we have seen, might themselves belong to nearly all of the different phratries. The number of persons

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known by this term must sometimes have been enormous and often very widely scattered through the tribe. The extension of the term given to the children of one whom the speaker called "sister" was likely to be smaller because all the children of the own sisters and the clan sisters would be members of the same clan, but a man also called "sister" those women whose fathers he called father's brothers, and through their mothers they might have belonged, as we have seen, to nearly all the phratries in the nation. In the case of a woman the term "my child" would have less extension and the term "my brother's child" greater extension. The remaining terms, those for grandfather, grandmother, grandchild, and those used between persons connected by marriage, were not confined within clan limits.

If these terms were used in the collective sense, which, from what we know of the terminology of other tribes having clans and from the hints dropped by Pareja, we suspect, it is easy to see that it would often be a question where to draw the line in the application of terms between certain persons nearly of an age. But since a distinct connotation goes with every term *irrespective* of considerations of age, is it not possible that different terms may on occasion have been applied to one and the same individual when it was desired to bring out a particular status with reference to the speaker? Thus the term mother's sister at once identifies the individual as a woman of one's own clan, the term mother's brother identifies him as a man of one's own clan, the term father's brother as a man of the father's clan, the term father's sister as a woman of the father's clan, the term father's sister's child as an individual of indeterminate sex of the father's clan, the terms elder brother, younger brother, and sister, as males or females whose fathers were those whom the speaker calls father or father's brothers or those whose mothers the speaker calls mother or mother's sisters, the term child as one's own child or the child of a man whom the speaker calls elder brother, younger brother, or mother's brother, the term for sister's child as one whose mother the speaker calls sister. If a woman is speaking, her term for child will be that given to her own child and to the children of the women she calls sisters, elder and younger, while her term for brother's child will be given to the children of those she calls brother, and those she calls mother's brother. Grandfather will indicate a very old man, grandmother a very old woman, and grandson one whose father or mother the speaker calls "my child", and probably a very young person of either sex. The connotation of the terms brought about by marriage will be readily understood. It thus appears that the terms of relationship when used in their broader applications might have

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been employed to localize an individual roughly and that several terms might have been used for the same person on different occasions or for different purposes.

Certain important facts also come to light regarding the institution of exogamy. We know from what Pareja tells us that a man could not marry into his own clan, in some cases, indeed, not into an entire group of clans. We know also that in tribes having several exogamous groups there was usually a strong repugnance, if not an absolute prohibition, against marriage into the clan of the father. Such a repugnance existed among the Creeks, and may very well have been present with the Timucua, although of this we have no definite statement. Finally, I know of no case where a man was permitted to marry a woman he called "sister", and with the Timucua, as we have seen, this term was applied to a woman of any clan whose father happened to belong to the clan of the speaker's father. It would seem from the information given us by Pareja that there were six exogamous divisions among the Timucua. Now, if we suppose that there were a hundred marriageable women in each division, six hundred in all, any man old enough to marry would not be permitted to marry a hundred of these because they belonged to his own clan, a hundred more because they belonged to his father's clan, and an indefinite number besides varying from a possible zero to ninety-nine whose fathers were of the same clan as his father. Thus almost half of the marriageable women in the tribe would be taboo to him. From this it appears that the assumed disadvantage under which tribes with but two exogamous divisions are sometimes supposed to labor in having their choice of a wife restricted to half of the women, may be no greater than that existing in tribes with several such exogamous divisions.

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The Domain of the Aztecs and their Relation to the Prehistoric Cultures of Mexico¹

By ALFRED M. TOZZER



IN popular conception the term "Aztec" has been employed to embrace all the semicivilized peoples of Mexico, including, in many cases, those as far north as the Pueblo area in New Mexico and Arizona. According to this idea the Aztecs are to Mexico and even to Central America what the Incas are to South America. In point of fact the term "Aztec", as will be pointed out, should be used in a much more limited sense.

The legendary history of Mexico is a mass of conflicting stories. The Toltecs were supposed to have been the earliest of the semicivilized people to enter Mexico. They found the country occupied by a rude hunting people called Chichimecs. Tula was founded by the Toltecs, according to tradition, in 752 A.D. and was destroyed in 1064.

The Toltecs, aided by their culture-hero Quetzalcoatl, were supposed to have brought in a knowledge of the arts and the hieroglyphic writing. They spoke the Nahuatl language, according to several early authorities.

The Aztecs, joining with eight related tribes, are supposed to have left their mythical home in Aztlan in the twelfth century (1168 or 1195). After numerous wanderings they arrived in the Valley of Mexico early in the fourteenth century. From this time onward the history is fairly definite and reliable. For a long time the Aztecs were relatively unimportant, they had no influence and no strength; for many years they were subject to the Colhuacans. There were several thriving communities in the Valley at this time, the Tepanecs at Atzacapotzalco, Colhuacan, Tezcoco, and several others. The Aztecs settled at Tenochtitlan, the present site of Mexico City, in 1325 or 1327. The first king reigned from 1376 to 1396. It was during the reign of the second king (1396-1417) that the wars began which gradually succeeded in gaining for the Aztecs first place among the peoples of Mexico. By skilful political moves, first with one ally

¹ Presented at the Pan American Scientific Congress, Washington, December 1915.

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and then with another, ascendancy was rapid. Wars were waged not only with the other Nahua-speaking peoples of the Valley of Mexico but with the Totonacs and Huastecs to the east and northeast, with the Mixtecs, Zapotecs, and some of the Maya peoples as far south as Guatemala. Clavigero (1817, vol. 3, 373-379) states that the Aztec dominion extended from 18° to 21° on the Atlantic and from 14° to 19° on the Pacific, a territory twice the size of California. These are the extreme limits reached by them and those allied with them. Within this area certain tribes were never conquered, as the Tlaxcalans, the Tarascans, and the Chiapanecs. Many of the conquered peoples, as the Mixtecs and Zapotecs, soon regained their independence.

Aztec place-names are found over all of Central America except Yucatan, British Honduras, the Peten and Alta Vera Paz districts of Guatemala, and the Mosquito coast. Some have concluded from this that the Aztec dominion covered this entire area. Colonies of Nahua-speaking peoples were founded in Central America as far south as the Isthmus. Aztec traders traveled north and south with much freedom. Voluntary and involuntary exiles were no doubt common. But there is no reason to suppose that the Aztec domain or the Aztec influence extended for any length of time south of the present boundaries of Mexico. Sapper (1905) has shown that migrations cannot be traced accurately by place-names. He also suggests that the Spaniards themselves, who were more or less familiar with the names of the Aztec settlements, introduced similar names in their migrations from place to place.

Let us return a moment and review the situation. Mexico first of all was occupied by a rude hunting people. The Toltecs, a Nahua-speaking people, were the first of the semicivilized peoples to arrive, followed several centuries later by the Aztecs and allied peoples whose civilization was blotted out by the Spaniards.

If we turn to the archeology of this region we shall find much data which will help us. Excavations carried on in the Valley of Mexico under the auspices of the International School of Archaeology has shown successive strata of occupancy, each stratum characterized by a distinct culture. This investigation has been one of the main problems of the International School in Mexico since 1911.¹ The importance of this stratigraphical work cannot be overestimated. For the first time we are able to coördinate the cultures of Mexico and we are beginning to see some light thrown on the complex problems of Middle American archeology.

¹ For a review of this subject see Summary of the Work of the International School of American Archaeology and Ethnology in Mexico, *American Anthropologist*, N. S., vol. 17, 384-395, 1915.

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The lowest of the three strata has been called "Archaic".¹ It is found about 3 to 3.5 meters beneath the present level of the Valley. This same culture is noted on the surface on many of the low hills surrounding the Valley, a fact that has given rise to much speculation. It was at first thought that the archaic type found beneath the surface in the bed of the Valley had been washed there from the surrounding hills. Much weight was given to this idea by the fact that many of the archaic figurines are badly water-worn. During later excavations many specimens were found showing no trace of water action and several show remains of white paint. There is strong reason to suppose, therefore, that the archaic type was left by people living in the Valley in pre-Toltec times.

The archaic type has also been found in Vera Cruz, Puebla, and near the Panuco river² on the east; in Michoacan, Colima, Morelos, western Jalisco, and Tepic on the west; and in Guatemala, Honduras, Salvador, Nicaragua, and Costa Rica. We have then a fairly uniform culture three meters or more below the surface of the Valley of Mexico, on the surface on several hills surrounding the Valley, and a similar culture in many other places in Mexico and Central America.

Another feature common over the greater part of Mexico and northern Central America is a calendar of 20 days, 18 months, and 5 additional days, together with other similar features. We have then two common factors throughout the area: a calendar, and the archaic type of figurine and pottery. The Mayas have been recognized as the people who developed the calendar to a point not reached in any other part of Middle America. They are usually now considered, furthermore, to have been the originators as well. The Toltecs, the Zapotecs, and other people probably borrowed it from them.

The time has not yet come when we can prove this from a study of the archeology, as we know practically nothing of the stratification of the Maya area and the country to the south.³ It may be shown that the archaic people were the originators of the calendar and that it was they who distributed it in their wanderings southward. It may also be shown by later investigations that each of the distinct cultures of Mexico and Central America developed out of the archaic, each in its own habitat and each along distinct lines. The language of the people of this early migration has not been definitely

¹ This culture has also been called "*Tipo de cerro*" and "*Tipo de montaña*". "Archaic" has been suggested by the writer as a more fitting term.

² Seler, 1915. The Peabody Museum has a head of a figurine, clearly of the Archaic type, from the vicinity of Tampico.

³ Evidences of distinct cultural strata are suggested in the results of the investigations of the Peabody Museum in the Ulua valley.

TOZZER—DOMAIN OF THE AZTECS

established. Spinden (1915) considers it was Nahuatl; but the archaic type is found in territory where Totonac, Tarascan, Huasteca, a dialect of Maya, and Zapotec are spoken. It is significant however, as Spinden points out, that in many places where the archaic is found in Salvador and Nicaragua, Nahua-speaking colonies are found.

Returning to the Valley of Mexico we find above the archaic a culture to which we apply the term "Toltec" or "Teotihuacan". To this culture is assigned the ruins of San Juan Teotihuacan, Cholula, and other sites in Mexico. This is a culture technically far ahead of the archaic. It is practically impossible to distinguish the greater number of pottery heads of Teotihuacan from those from the middle stratum in the Valley of Mexico. There are a few types however which seem to be found in each of these areas. We know the Toltecs spoke Nahuatl.

The influence of the Toltecs is seen very strikingly at Chichen Itza, a Maya site in northern Yucatan. The Toltecs were employed by the Itzas as mercenaries in their wars with other Maya cities. The Toltec influence in Yucatan was from about 1200 to 1450 A.D. We have here a bond between the Maya and the Toltec civilization. Chichen Itza is a very late site, and the latest period in the history of the city shows the Toltec influence. The Toltec culture, therefore, is late relative to that of the Maya, which goes back at least to the first century of our era. Tula was, according to the tradition, as has been stated, established by the Toltecs in 752 and destroyed in 1064. These dates have usually been considered too late to be regarded as historic. From the fact that the Toltec influence at Chichen Itza probably began only about 150 years after the destruction of Tula, we may perhaps argue that these dates may not be far wrong after all.

The Toltecs have often been regarded as the carriers of civilization throughout Middle America and as the inventors of the calendar. They appear too late in history to be regarded in this light. Either the Mayas invented the calendar, or, as seems to this writer possible, the beginning of the idea of a calendar was present among the archaic peoples and it was they who distributed the idea over the greater part of Middle America.

Returning to the Valley of Mexico, we come finally to the top-most stratum of occupancy, the Aztec. We use the term here to include not only the Aztec of Tenochtitlan but also the contemporaneous cultures of the Colhuacans, Tepanecos, the Tezcocans, and other allied peoples. We note individual differences throughout all the latest sites in the Valley; the pottery of Colhuacan differs from

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that of Tezcoco, and this again is different from that of the Tepaneco sites.

The fairly limited area in which the remains of these latest types are found shows conclusively that however far the Aztecs and their allies extended their political dominion, they did not succeed in implanting their material culture much beyond the southern boundaries of Mexico. Aztec influence is seen in a few sites in Central America, as at Santa Rita in British Honduras and at Santa Lucia Cozumahualpa in Guatemala, but the typical figurines and pottery are not present.

I have tried to show that the term "Aztec" as commonly applied to the prehistoric peoples of Mexico is a misnomer. The Aztecs were one of several Nahua-speaking tribes who occupied the Valley of Mexico at the time of the Conquest. Their political dominion was large for a short time, while their cultural influence seems small in comparison with that of the preceding Toltec and the Archaic civilizations.

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The Art of the Great Earthwork Builders of Ohio

By CHARLES C. WILLOUGHBY



ONE of our most interesting as well as least understood archeological culture groups is that which attained its greatest development in southern Ohio and whose outposts extended into some of the neighboring states. This group of people had attained a high degree of native culture and had become wealthy and powerful according to native standards. They had mastered certain simple geometrical problems which were apparently unknown to their neighbors, had learned the principle of the lathe, and made the first cutting tools of iron so far known in America. It seems that nearly all of the greater earthworks of southern Ohio were built by them, but some of the smaller mounds, inclosures, and burial places should doubtless be attributed to other tribes.

The great earthworks under consideration are unquestionably prehistoric and apparently antedate the occupancy of this region by any known tribe. They consist mainly of round, square, and octagonal inclosures, protected ways, burial mounds, and a few domiciliary and effigy mounds. No object of European origin has been found with any of the original burials in these mounds. Intrusive burials of the later Indians are, of course, occasionally encountered, but these must not be confused with original interments. Most of the artifacts illustrated in this paper were taken from mounds containing skeletons and clay altars or places of sacrifice. The explorations were conducted under the general direction of the late Prof. F. W. Putnam, by Dr Metz, Mr Moorehead, and others. The specimens from the Turner and Liberty groups are in the Peabody Museum of Harvard University, and those from the Hopewell group are in the Field Museum at Chicago.

The skeletons and altars for the greater part were found near the base-line of the mounds. The altars are usually heaps of clay raised a foot or more in the center and have sides sloping outward and a depression a few inches deep in the top which usually shows signs of extreme heat. These altars are of various sizes, but usually the cavity or depression is about three feet in diameter. In the larger mounds

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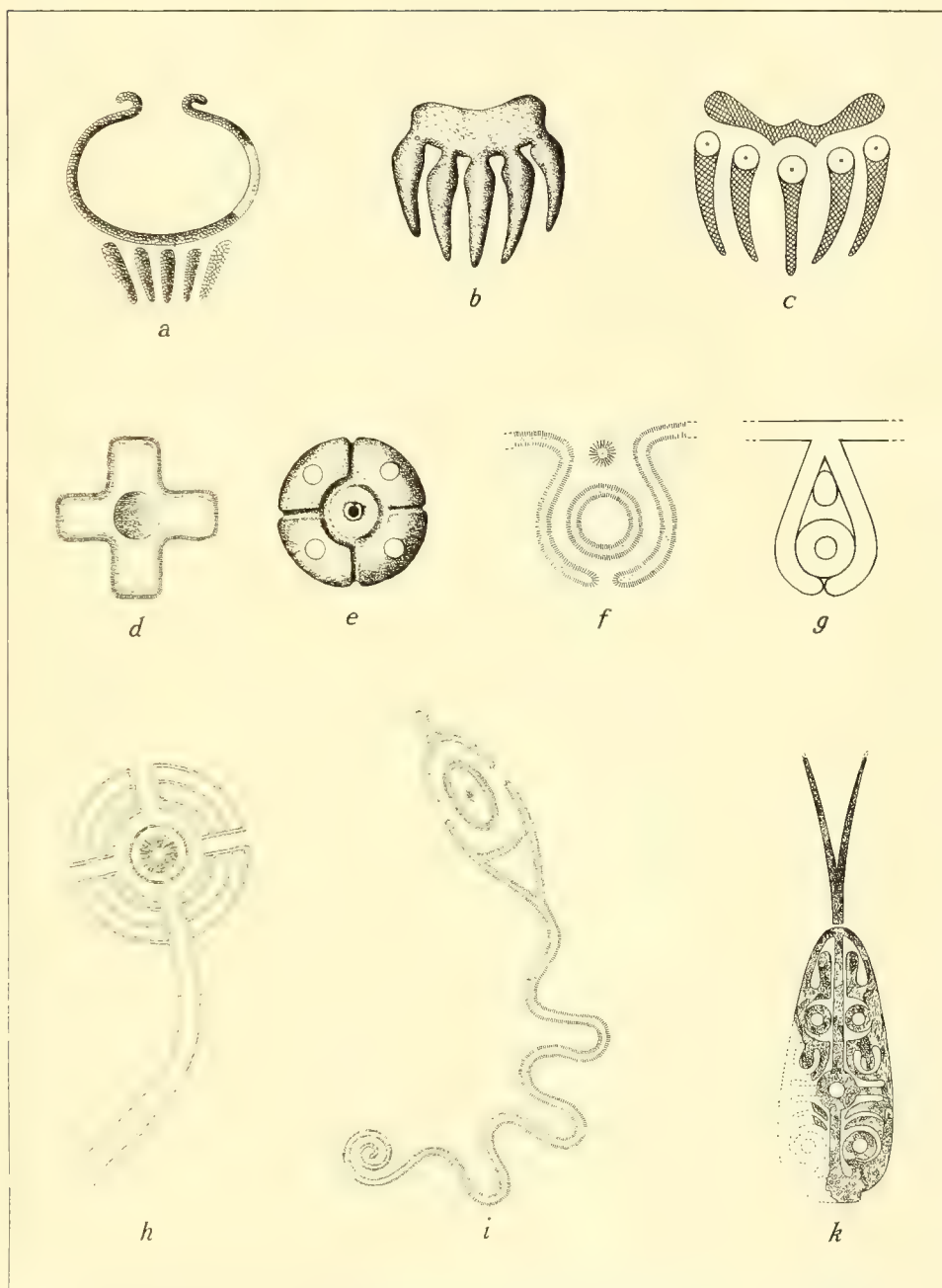
which have been systematically explored, notably those of the Porter, Hopewell, Turner, and Liberty groups, a considerable number of skeletons were found in the same mounds with the altars. The number of altars occurring in a single mound ranged from one to four. It is from the altars that many of the objects described in this paper were taken. Other specimens illustrated were found with skeletons or in deposits near them.

SYMBOLIC EARTHWORKS

Among the most interesting of the earthworks, when regarded independently of the artifacts they contain, are the effigy mounds, which appear to be related symbolically to certain objects recovered from the tumuli. A brief notice of some of them may be of interest.

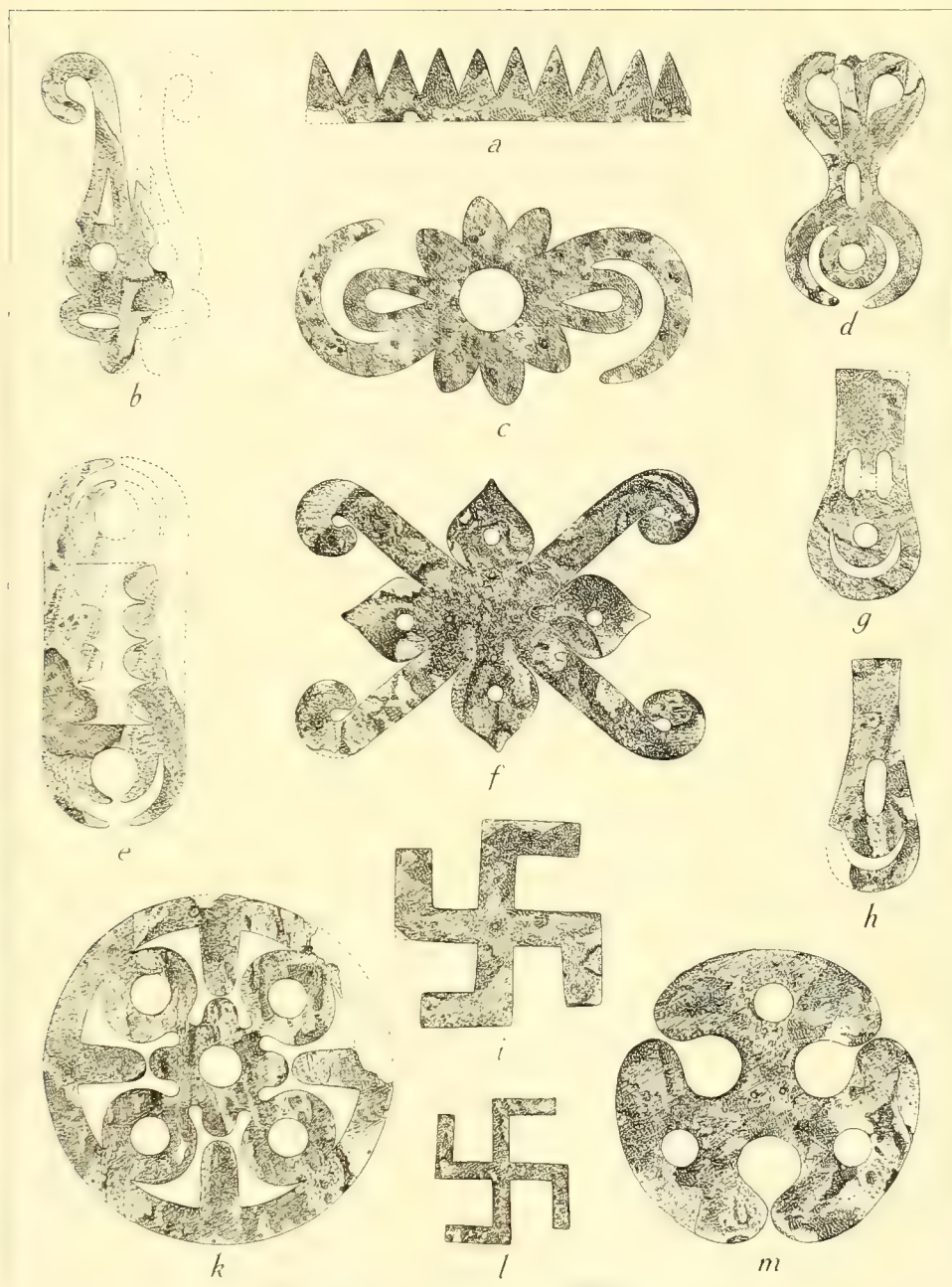
The Serpent Mound of Adams county is the best known of the few earthworks of this class. The illustration of this work shown on plate I, *i*, is reproduced from Professor Holmes's drawing, made in 1886, and undoubtedly represents the effigy much as it appeared to its builders. MacLean's plan, made from careful surveys in 1885, agrees with the above very closely, the principal difference being in the broadening of the extreme projection in front of the oval and the adding of two small spurs thereto. Squier and Davis's drawing is incorrect in several respects, and seems to be more like a sketch-plan made without surveying instrument than the accurate survey claimed by them. In the Peabody Museum of Harvard University there is an unfinished plan from a survey made by Thomas P. Gore of Hillsboro, Ohio, in 1878, which corresponds to those of MacLean and Holmes with the exception of the wishbone-shaped section in front of the oval which is not indicated. In this plan the embankments upon either side of the rear half of the oval which connect with that of the triangular inclosure appear as shown by both MacLean and Holmes. Portions of these, and the wishbone-shaped embankment inclosing the front of the oval, were much less conspicuous than the oval and the main portion of the serpent. These were not considered by Professor Putnam as parts of the effigy at the time of its restoration. Before entering into details regarding the peculiar features of this earthwork, I desire to call attention to the serpent head wrought from copper shown in plate I, *k*, which was found with many other copper objects in the great mound of the Hopewell group.

As is well known to anthropologists, the serpent occupied a prominent place in the religious life of many tribes north of Mexico, as well as in Mexico and Central America, and it appears in combination with the cosmic symbol, or some of its parts, in various



SYMBOLIC EARTHWORKS AND ANALOGOUS FORMS FROM THE BURIAL
MOUNDS, OHIO

a, Effigy of stone, Paint Creek valley, probably representing bear-claws; *b*, *c*, Bear-claws in copper and incised upon bone, Hopewell group; *d*, Earthwork in form of cross, Pickaway county; *e*, Copper ear-ornament with cosmic symbol, Hopewell group; *f*, Gateway to great inclosure near Hamilton, Butler county; *g*, Same design incised upon bone, Hopewell group; *h*, Portion of great serpent-like earthwork near Portsmouth; *i*, Serpent mound, Adams county; *k*, Cosmic symbol in form of serpent head, in copper, Hopewell group. ($\frac{1}{9}$)



COPPER SYMBOLS FROM THE OHIO MOUNDS

c, Turner group, Little Miami valley. *a*, *b*, *d*-*m*, Hopewell group, Ross county. (About $\frac{1}{4}$)

WILLOUGHBY—ART OF EARTHWORK BUILDERS

sections. The cosmic symbol in its complete form represents the world as known to the Indians and usually consists of a circle or concentric circles inclosing a cross and a central disc or circle. This is said to represent the sun, the four directions or four winds, the horizon, and also the earth, air, and water. Sometimes a dot or a circle appears in the center of each of the four world-quarters: the swastika is undoubtedly derived from this sign. The serpent, which may be regarded as the god of wind, rain, and water, and the antithesis of the sun, often appears in combination with the cosmic symbol or parts thereof. The shell serpent gorgets of Tennessee are well-known examples. In these, the serpent is coiled in the center of the disc and the four arms of the cross connect it with the outer circle as in figure 1. A rarer form in shell of a serpent head with a circle and cross, also from Tennessee, is also shown in the accompanying drawing.¹



FIG. 1.—Combined cosmic and serpent symbols.

Returning to the copper symbol (pl. I, *k*), it is at once apparent that we have a serpent head in combination with the cosmic sign. The outline of the latter instead of being circular conforms to and forms a part of the outline of the head, and the arms of the cross which radiate from the central sun circle are unequal. In the serpent portion of the symbol we have the forked tongue (which was not attached to the head when found, but evidently belongs with it), the nostrils, eyes, two U-shaped designs back of the eyes, and on each side near the base of the head an eye-like design with two curved tooth-like appendages, analogous to those on the mica serpent shown on plate IX, *m*. These probably represent the four horns which appear on most serpent designs north of Mexico, and replace the plumes of the serpent deity of Mexico and Central America.

With the above interpretation in mind, we will turn to the drawing of the Serpent Mound with a clearer understanding of this remarkable effigy, which probably represents a serpent in its entirety, combined with the cosmic symbol.

The outline of the serpent head is marked by the interrupted oval, from the front of which projects the tongue. It is interesting to note that in MacLean's drawing there are two narrow diverging projections from the sides of this appendage near its free end, which he calls the fore-legs of the "frog". If these pointed projections really existed, they undoubtedly represented the fork of the tongue. The inner oval inclosing the altar of stones where fires symbolizing

¹ *The Archaeologist*, vol. II, p. 12.

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the sun were kindled is doubtless similar to one of the inner circles which occur in many of the symbols of this class. This, together with the outer interrupted oval, was compressed to conform to the outlines of the reptile's head. The opposite openings in the outer oval may represent two arms of the cross. They seem to be analogous to similar openings shown in *h* of the same plate. It is not improbable that these may have been at one time a cross within the oval.

I am well aware that the above interpretation of the serpent effigy is at variance with all others, but it is much more in keeping with what we know of the symbolism of these Indians than that of Squier and Davis who saw in it a serpent with open jaws swallowing or ejecting an oval figure, or of MacLean who thought it represented a frog ejecting an egg into the open jaws of the snake.

A very remarkable earthwork which seems to be of like nature to the one described above occurs on both banks of the Ohio river near Portsmouth. It is shown on plates XXVII and XXVIII of Squier and Davis. A portion of this is illustrated on our plate I, *h*. It consists of a truncated central mound surrounded by a ditch and having a graded way to the top. This is inclosed by concentric circles interrupted by passageways in the form of a cross. This great cosmic symbol is 1300 feet in diameter and is connected with a group of works three and one-half miles distant by serpent-like parallel lines of earthworks. This gigantic conventionalized figure probably embodies ideas similar to those of the Serpent Mound.

In Paint Creek valley, near Bournville, is an effigy of stones¹ which is reproduced on plate I, *a*. It is about 250 feet in diameter and doubtless represents the foot and claws of the bear. Analogous designs are shown in *b* and *c*. The former is cut from copper and the latter forms a part of the design incised upon the human femur illustrated in *i*, *l*, plate VI.

The earthwork in the form of a cross with the central sun symbol² shown in *d*, occupies a narrow spur of land in Pickaway county. This undoubtedly embodies a meaning similar to that of the cross and central circle represented in *e*, *h*, and *k*. The gateway to the great inclosure near Hamilton, Butler county,³ is represented in *f*. This is probably also symbolic, as we have a like design upon the bone shown in *g*, and plate VI, *i* and *l*.

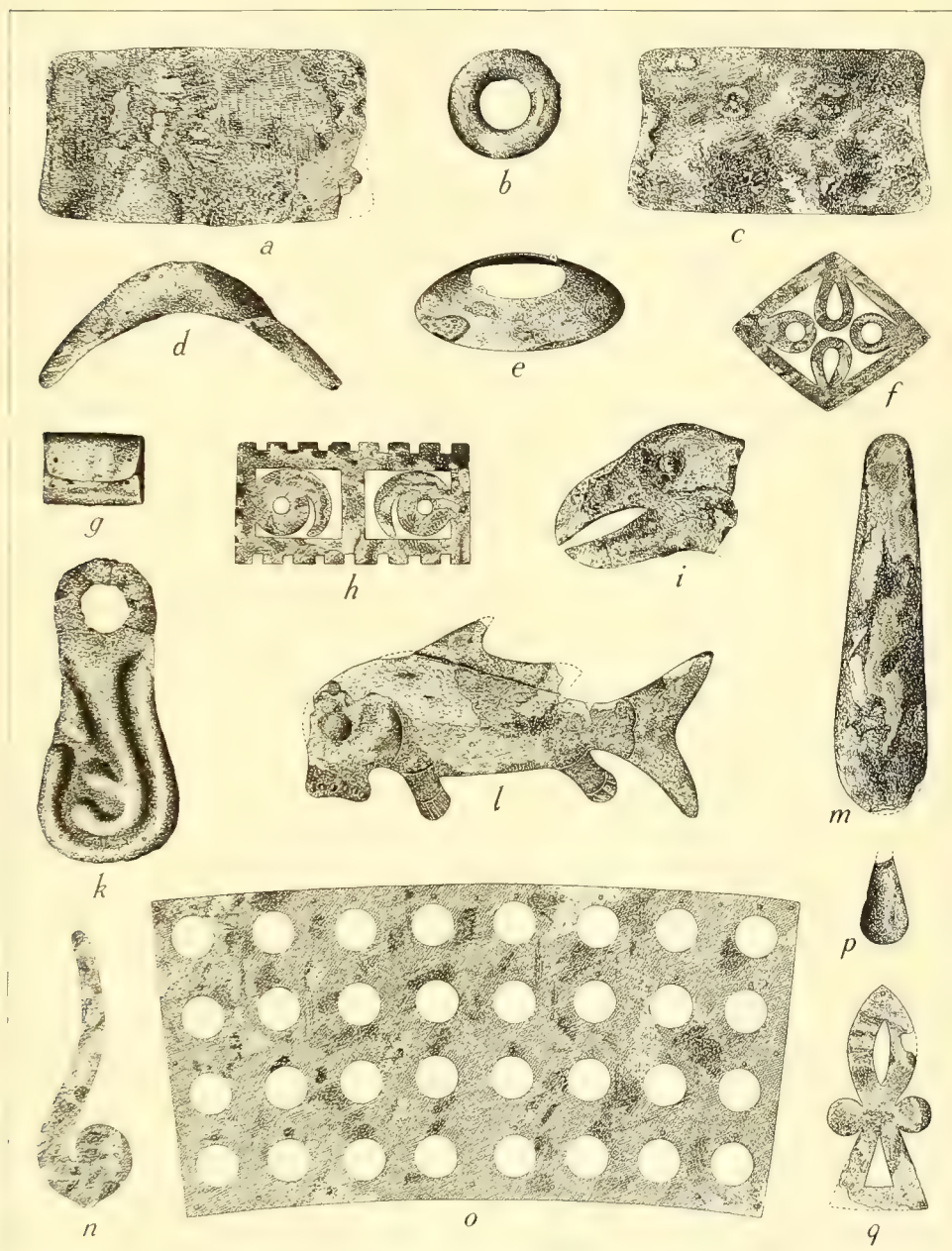
ARTIFACTS OF METAL

In common with other American tribes, the builders of the great

¹ Squier and Davis, plates III and XXX.

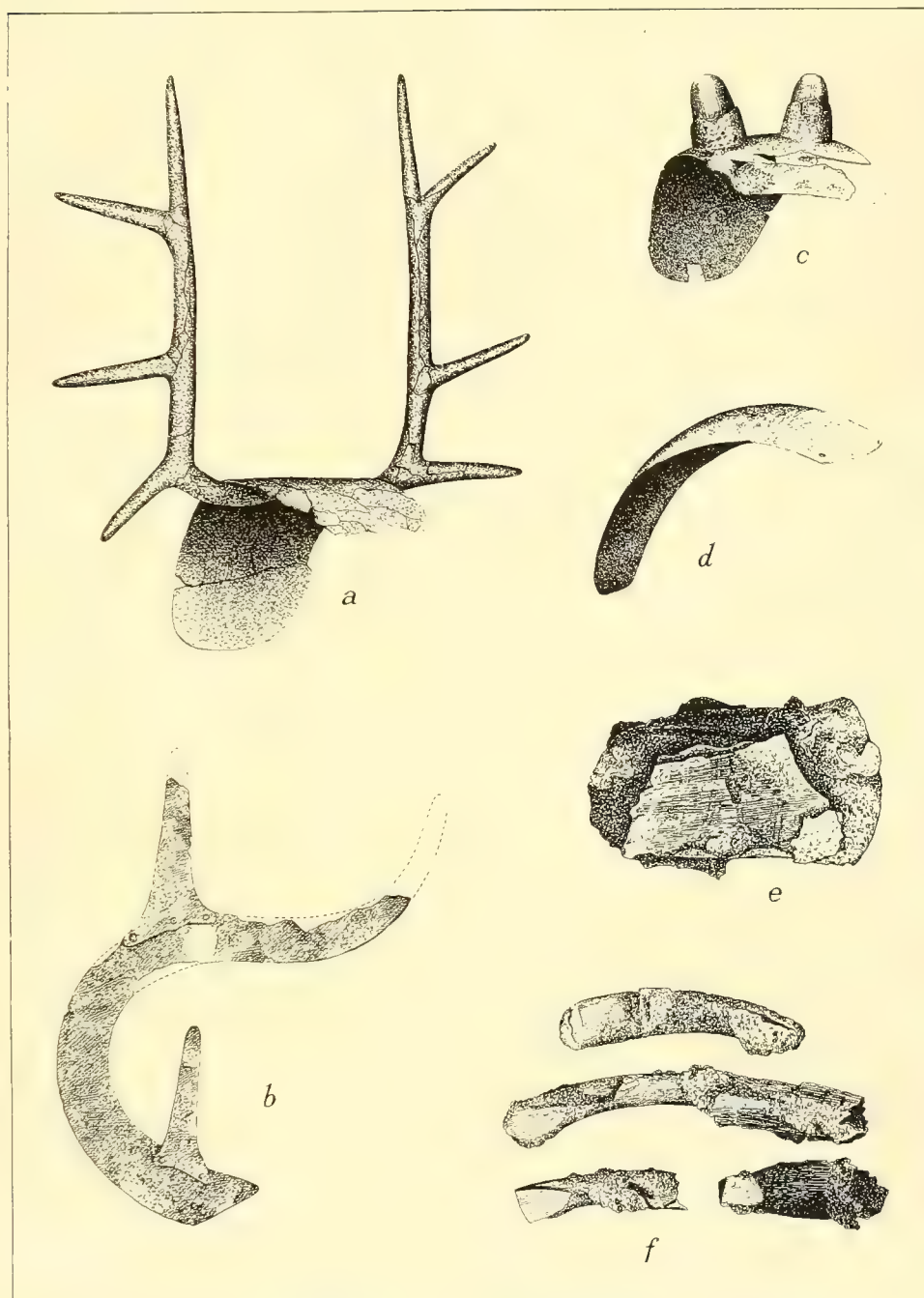
² Ibid., plate VIII.

³ Ibid., plate XXVI.



COPPER OBJECTS FROM THE OHIO MOUNDS

All from the Hopewell group, Ross county, excepting *n*, *o*, which are from the Turner group. (34)



METAL HEAD ORNAMENTS AND TOOLS FROM THE OHIO MOUNDS

a, Head ornament of copper and wood, representing full-grown deer antlers; *b*, Deer antler cut from copper; *c*, Head ornament with sprouting antlers of copper and wood; *d*, Copper head plate; *e*, Meteoric iron blade; *f*, Meteoric iron chisels, two of which have portions of antler handles still adhering. (*a-d*, $\frac{1}{5}$; *e-f*, $\frac{1}{3}$)

WILLOUGHBY—ART OF EARTHWORK BUILDERS

earthworks of Ohio had become proficient in working native copper. This metal seems to have been highly prized in this region and was made into a great variety of ornamental or symbolic forms. Its practical use seems to have been limited principally to ax and adz-blades, which occur in considerable numbers with burials or as parts of sacrificial deposits. Indeed, it is not improbable that these copper blades were esteemed as much for their intrinsic worth as for their efficiency as tools. A large number of copper blades were found near two skeletons in the great mound of the Hopewell group, the largest of which weighed thirty-eight pounds.

The greater number of the artifacts of copper that have been recovered are of an ornamental or symbolic character. Most of the copper from which they were made undoubtedly came from the Lake Superior region, although some may have been obtained from erratic masses carried southward by the ice sheets in glacial times. The purest and most ductile pieces were used in the formation of thin sheets for covering various ornaments, or for cutting into symbolic forms; and the less malleable masses were worked into objects which did not require as much hammering. Some of the nuggets taken from the altars in an unworked or slightly worked state contained impurities which rendered their further working impossible or unprofitable. Experiments conducted by the present writer¹ show that alternate hammering and annealing are essential to the successful working of native copper into thin sheets, and it is probable that the aid of fire was sought by most Indians in working this metal into any form that required much hammering.

The specimens shown on plates II-V were taken from burial deposits and altars in the great mound of the Hopewell group (Clark's Works), Ross county; from the mounds of the Turner group, Little Miami valley; and from the Liberty group of Ross county, most of them coming from the first locality. Figures *i* and *l* represent the straight-armed swastika. As will be seen by turning to *f*, plate X, it is not improbable that these objects were worn at the back of the head.

The design shown in *k* is undoubtedly a cosmic symbol, and the analogy of its more prominent features to those of the serpent head, plate I, *k*, seems apparent. The designs *d*, *g*, and *h*, are undoubtedly derived from the human face, and they show a marked sense of humor on the part of the artisan who made them. On plate III, *a* and *c*, are represented two gorget-like plates such as are usually found with skeletons. One of these shows the remains of a piece of twined woven textile which had been preserved by contact with the

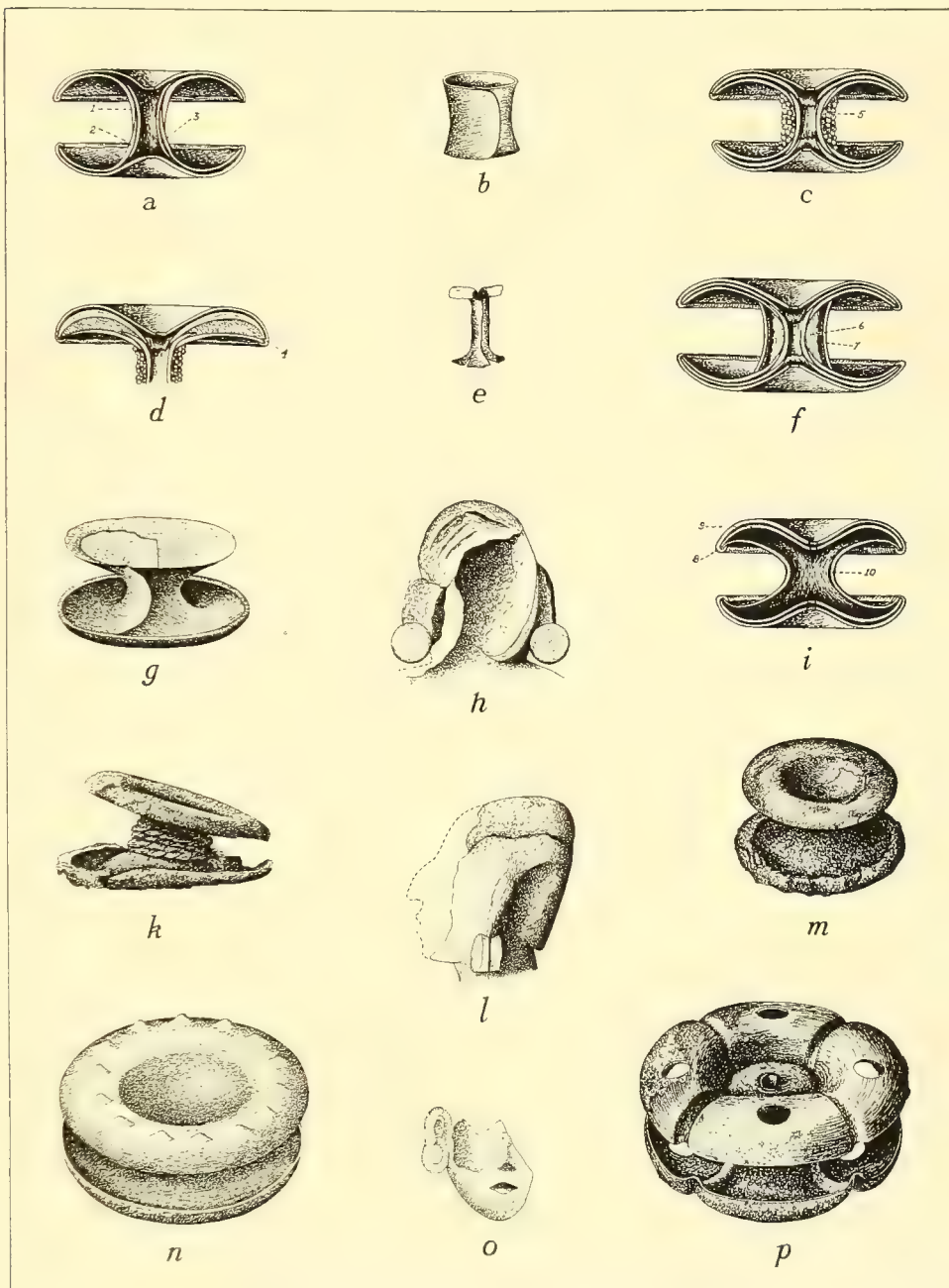
¹ *American Anthropologist*, N. S., vol 5, p. 55.

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copper. *d* and *g* are drawings of a crescent-shaped gorget and what is probably a bracelet. These were found with a skeleton. And on the same plate, *h*, is a conventionalized representation of the double serpent head which appears on the Cincinnati Tablet. What is apparently a frontlet is illustrated in *o*. Two of these were taken from one of the altars of the Turner group. So far as we may judge from specimens thus far recovered, the great earthwork builders of this region had not attained a proficiency in embossed work which equaled that of some other sections. Overlaying, however, was followed in making a considerable variety of objects. One of the most elaborate examples of this work is shown in two of the head-dresses on plate iv. The antlers of the largest of these are made from carefully selected branches of wood, covered with thin sheets of copper. The cores of the sprouting antlers on the second head-dress (*c*) are also of wood, very neatly covered with thin sheets of the same metal. Some excellent examples in overlaying are shown in the ear-ornaments, bracelets, beads, and button-like objects where the foundation is of clay, wood, or copper, and the overlaying is of thin sheets of silver, meteoric iron, or selected copper. Bracelets of metal occur frequently with burials and are sometimes found upon altars, and while the form varies somewhat, they are usually of the simplest construction. Some of these are of copper, very neatly overlaid with thin silver.

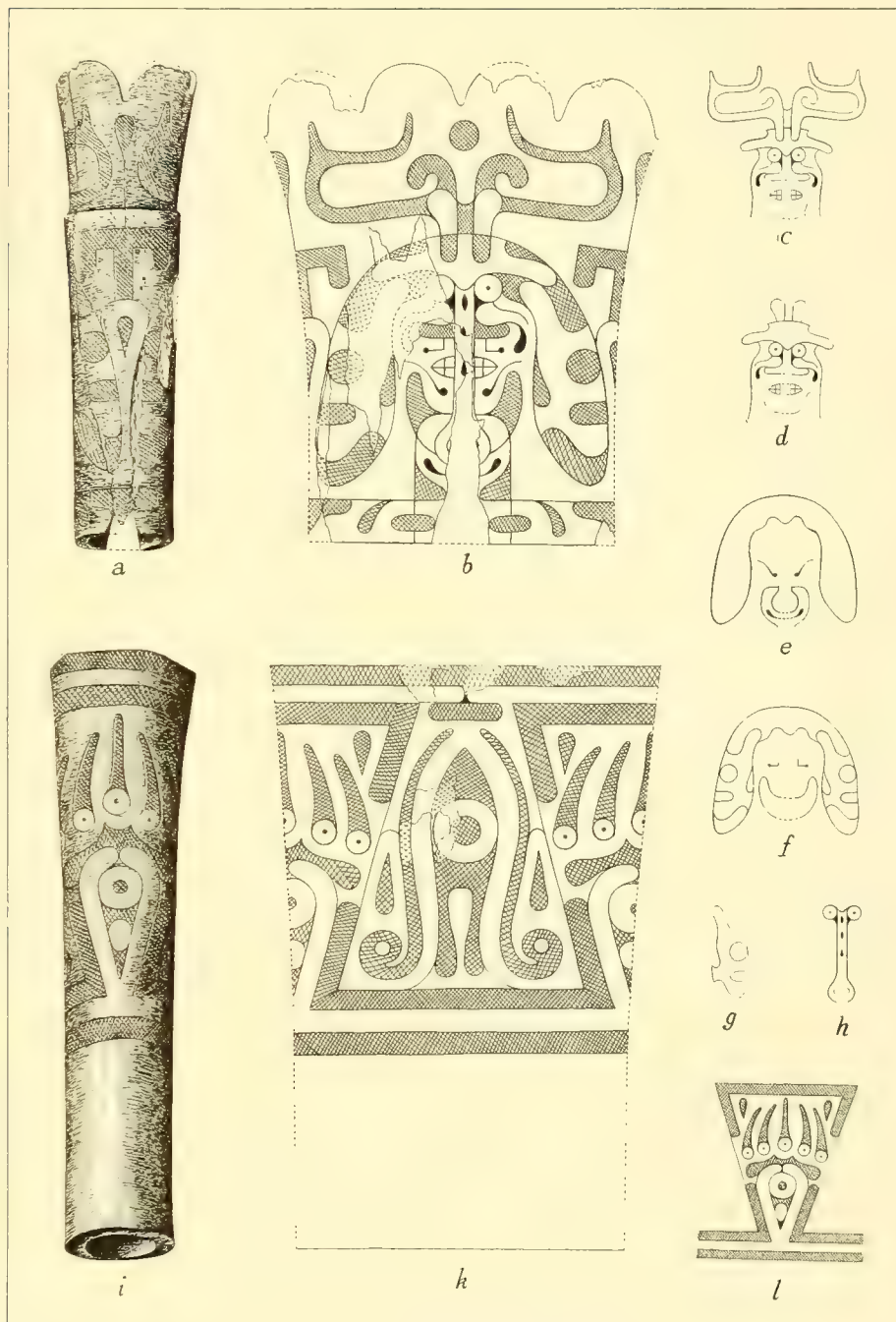
One of the most common personal ornaments of metal is the ear-plug, illustrations of which appear on plate v. These are often found with skeletons and also occur in considerable numbers on the altars. A part of the head of a terracotta effigy from an altar of the Turner group is shown in *h*, *l*, which illustrate the manner of wearing these ornaments. Another fragment showing the perforation in the lobe of the ear for the insertion of the ornament is illustrated in *o*. Unusually fine specimens of these ornaments are shown in *n* and *p*. A pair of each of these was found with the extensive copper deposit in the great mound of the Hopewell group.

Various methods of constructing these objects are shown in *a-g*, *i*. A hollow rivet, made by rolling together a strip of copper, usually connects the inner plates of the two discs. One of these is shown in *e*. Their relative positions are illustrated in the cross-sections, *a*, *c*, *d*, *f*. Another less common method of joining the discs is illustrated in *g* and *i*. Here the ends of the pulley-shaped piece of copper are much expanded, and to these the discs are secured by turning under the edge of the outer plate. In *g*, the upper disc has been removed to show the construction. In most of the specimens, each of the two



COPPER EAR-PLUGS FROM THE HOPEWELL GROUP, OHIO

a, c, d, f, i, Cross-sections of ear-plugs, showing methods of construction; *b, e, g*, Pieces of copper prepared for connecting the discs; *h, m, n, p*, Finished ear-plugs. (About $\frac{2}{3}$.) *h, l*, Two views of portion of head of terracotta figurine showing ear-plugs in position; *o*, Fragment of head of terracotta figurine with lobe of ear perforated for insertion of ear-plug, Turner group. (About $\frac{1}{4}$.)



ENGRAVINGS FROM THE HOPEWELL GROUP, OHIO

a, i, Engravings on portions of human femora ($\frac{1}{2}$); *b*, Complete design on *a*; *c-h*, Elements forming the composite design of *b*, somewhat reduced; *k*, Complete design on *i*; *l*, Portion of the design on *i*, reduced. Found with skeletons.

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discs which are joined by the rivet is made up of two or three plates, the outer of which is of carefully wrought copper, silver, or meteoric iron. Sometimes, to assist in keeping the plates in their proper positions, the space between them is filled with clay (*d* 4) which upon drying adds much to the firmness of the ornament. Sometimes the rivet is reinforced by hammering a piece of metal around it as illustrated in *f* 6, or by the use of an outer band, *b*, applied as *f* 7, or the rivet may be wound with vegetal fiber or cord as in *k*, *d*, and *c* 5.

OTHER METALS

The occurrence of meteoric iron in most of the mound groups that have been systematically explored, in the form of nuggets or worked into various objects, shows that its malleability was generally understood by the people of this region. It was worked into head-plates, breast-plates, beads, coverings for ear-plugs, adz-blades, chisels, and drills. Plate IV, *e*, shows a meteoric iron blade, and several chisels of this metal with portions of antler handles still adhering to two of them are illustrated in *f*.

Native silver sometimes occurs in considerable masses in the mounds. There are two nuggets in the Peabody Museum of Harvard University the combined weight of which is thirteen and three-quarters pounds. These were taken from a mound at Grand Rapids, a northern outpost of the Ohio culture group. Silver seems to have been used principally for overlaying copper and wooden objects, such as buttons, ear-plugs, and bracelets. Many beads were also made of silver, some of them being quite massive.

Gold was very rare indeed in the mounds. There are one or two references by early writers to finding of gold objects, but the only authentic specimens known to the writer are several small sheets hammered from small nuggets, which were taken from an altar of the Turner group and are now in the Peabody Museum at Cambridge.

ENGRAVINGS UPON BONE

The decorated human femora illustrated in plate VI, *a* and *i*, were found with skeletons in the great mound of the Hopewell group, and the designs engraved upon them are shown developed in *b* and *k*. The different parts making up the composite human head and its appendages in *b*, are illustrated somewhat reduced in *c-h*. In *c* and *d* we have human heads wearing head-plates supporting antlers similar to those shown on plate IV, *b* and *c*. What appears to be the beak of the spoonbill is represented in *h*.

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Two more of these remarkable engravings are illustrated on plate VII. The upper one, *a*, was taken from an altar of the Turner group in a fragmentary state. The developed design appears in *b* and *c*, and the more prominent features composing the design are shown somewhat reduced in *d*, *e*, *f*. The conventionalized head of what may be the bison appears only when the design *c* is reversed.

The specimen illustrated in *g* was found in 1801 in a mound at Cincinnati. The developed design, *h* and *i*, are from drawings by Dr G. B. Gordon, and are described by him in volume II of the *Transactions of the Department of Archæology of the University of Pennsylvania*. It is a highly conventionalized drawing of one of the carnivora.

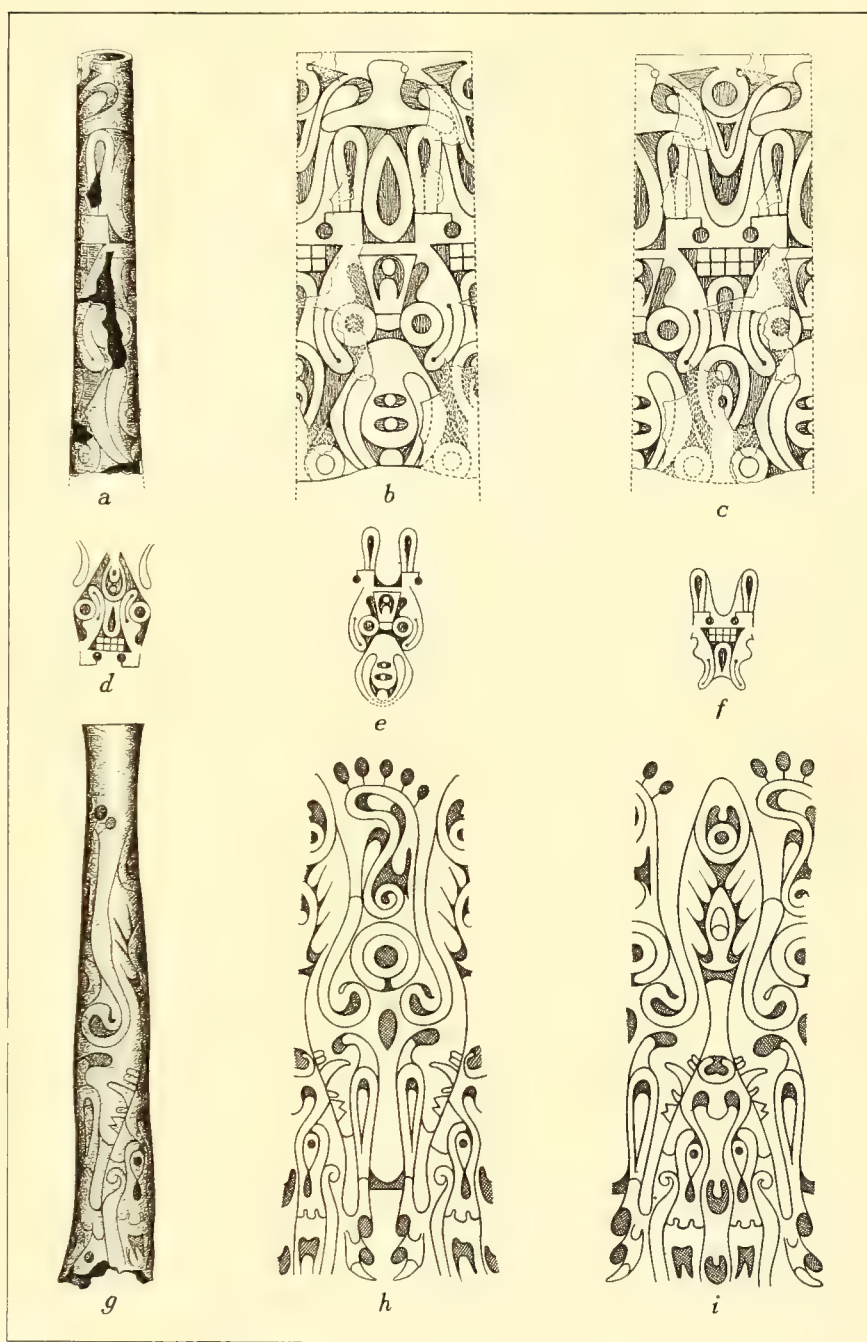
The remarkable designs illustrated on plate VIII, *g* and *h*, are incised upon discs cut from the parietal bones of a human skull. They are from an altar of the Turner group. The designs are alike, excepting that they are reversed. Each consists of three highly conventionalized bird forms joined together. The central bird with ears and with large legs terminating in four claws, probably represents an owl. The other two are less easily identified.

The spatula-like implement shown in *b*, made from the rib of a large mammal, is also from the Turner group. The bird incised upon the handle is one of the most artistic Indian drawings thus far known. The lines were originally filled with red pigment.

Those shown in *c*, *d*, *e*, *f*, are from the Hopewell group. *c* is carved upon the thin bone of a large bird and represents the ocelot; the markings upon the body are true to nature and although somewhat conventionalized they occupy their proper position.

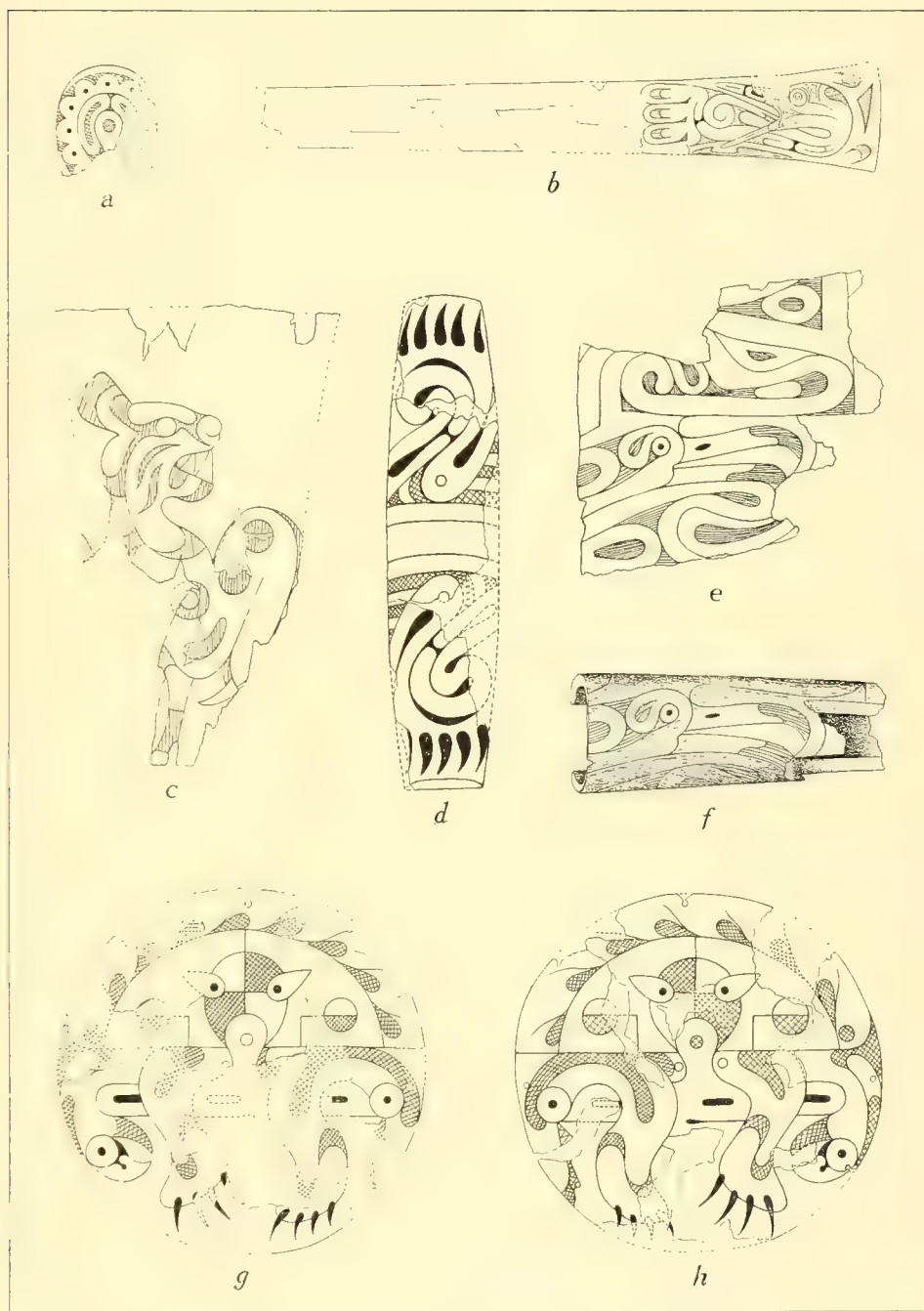
MICA OBJECTS

Mica was highly valued and was obtained in considerable quantities by the earthwork builders, probably from the Appalachian region. The crystals or plates are often of large size, and are frequently found with skeletons or as sacrificial deposits in the mounds. The thin sheets into which these plates are easily divided were sometimes cut into ornaments or symbolic figures such as are shown on plate IX. These were taken from altars of the Hopewell and Turner groups with many fragments of similar objects cut from this mineral. The edges are as smooth and even as though cut with a sharp steel implement; experiments, however, show that small flaked knives of flint will do the work equally well. The perforated discs, *a* and *c*, were cut with some kind of instrument for describing accurate circles. Fragments of large symbolic designs of a nature similar to those cut



ENGRAVINGS FROM THE OHIO MOUNDS

a, Engraving upon portion of a human ulna, Turner group of mounds ($\frac{2}{5}$); *b*, *c*, Complete design upon *a*, two developments; *d*, Principal design shown where *c* is reversed; *e*, Principal design shown in *b*; *f*, Principal design shown in *c*; *g*, Engraving upon bone found in mound at Cincinnati in 1801 (after G. B. Gordon); *h*, *i*, Complete design upon *g*, two developments.



ENGRAVINGS FROM THE OHIO MOUNDS

a, Fragment of thin shell engraved upon both sides; *b*, Fragmentary spatula-like object made from rib-bone; *c*, Figure of ocelot upon bird-bone; *d*, engraved antler object; *f*, Engraving upon bone; *e*, Developed design upon *f*; *g*, *h*, Engraved discs cut from the parietal bones of the human skull. (About $\frac{1}{2}$.) *b*, *g*, *h*, Turner group; all others, Hopewell group.

WILLOUGHBY—ART OF EARTHWORK BUILDERS

from copper are shown in *e-h*. The general method of laying out a design is illustrated in *i*. This was evidently done in free-hand with a sharp flint. Figures *l* and *o* are in the form of stones knives or projectile points. Figure *l* was lying in contact with an obsidian implement of like form and has incised upon its surface the outline of what is apparently a barbed spear-point. That these people were familiar with the atlatl or spear-thrower is evident from the design shown in *n*. An interesting delineation of the horned serpent is shown in *m*. It should be noted that the disc from the center of which the long horn projects has two short arms which lie against the horn for a part of its distance. If we eliminate the long horn we have remaining a disc with two arms and a central perforation, a form analogous to those occupying similar positions upon either side of the serpent head shown in *k*, plate I. The grotesque human head, *k*, is another good illustration of the humor of these Indians. The excellent representation of the upper portion of a bear is illustrated in *b*. This is one of several taken from an altar of the Turner group. Portions of these effigies were carefully painted in red, brown, and pink pigment. Several bird-like objects which had originally been painted were taken from this altar. One of these is shown in *d*.

TOBACCO-PIPES

The remarkable collection of tobacco-pipes obtained by Squier and Davis from the altar of one of the tumuli of "Mound City" is too well known to archeologists to be considered here. Mr W. C. Mills, of the Ohio Archeological and Historical Society, made a similar find in 1915.¹

One of the most elaborate pipes so far recovered is illustrated on plate x, *a, b*. This was taken from one of the altars of the Hope-well group and represents the spoonbill resting on the back of a fish. The cavity for the tobacco is in the body of the bird and the perforation for the passage of smoke extends through the body of the fish, the outer opening being its mouth. This appears to be made from a kind of claystone and is colored black by the confined smoke of the altar fires. A front view of the bird's head and beak is shown in *k*. The incised lines extending from the nostrils to the tip of the beak should be compared with those represented in *l*, which is a drawing of the head and beak of a roseate spoonbill. A portion of the beak of the spoonbill carved in ivory is represented in *m*; this was taken from an altar of the same mound as the pipe.

Ivory was used to a considerable extent by the Ohio earthwork

¹ See Mr Mills' paper in the present volume.

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builders. The source of at least a part of it was the fossil tusks of the mammoth.

In *c* we have one of the simpler forms of pipes of this culture area. It is cut from a beautiful piece of green serpentine, and a large pearl was probably set in the cavity near one end. The finely formed pipe shown in *d* has the design *e* reversed upon the bowl.

A very unusual pipe from the Liberty group of mounds, Ross county, is illustrated in *f*, *g*. It is carved from a very compact brown stone. The neck and part of the head have been broken off. The opening to the bowl is through the mouth, and the smoke was drawn through a perforation in the neck.

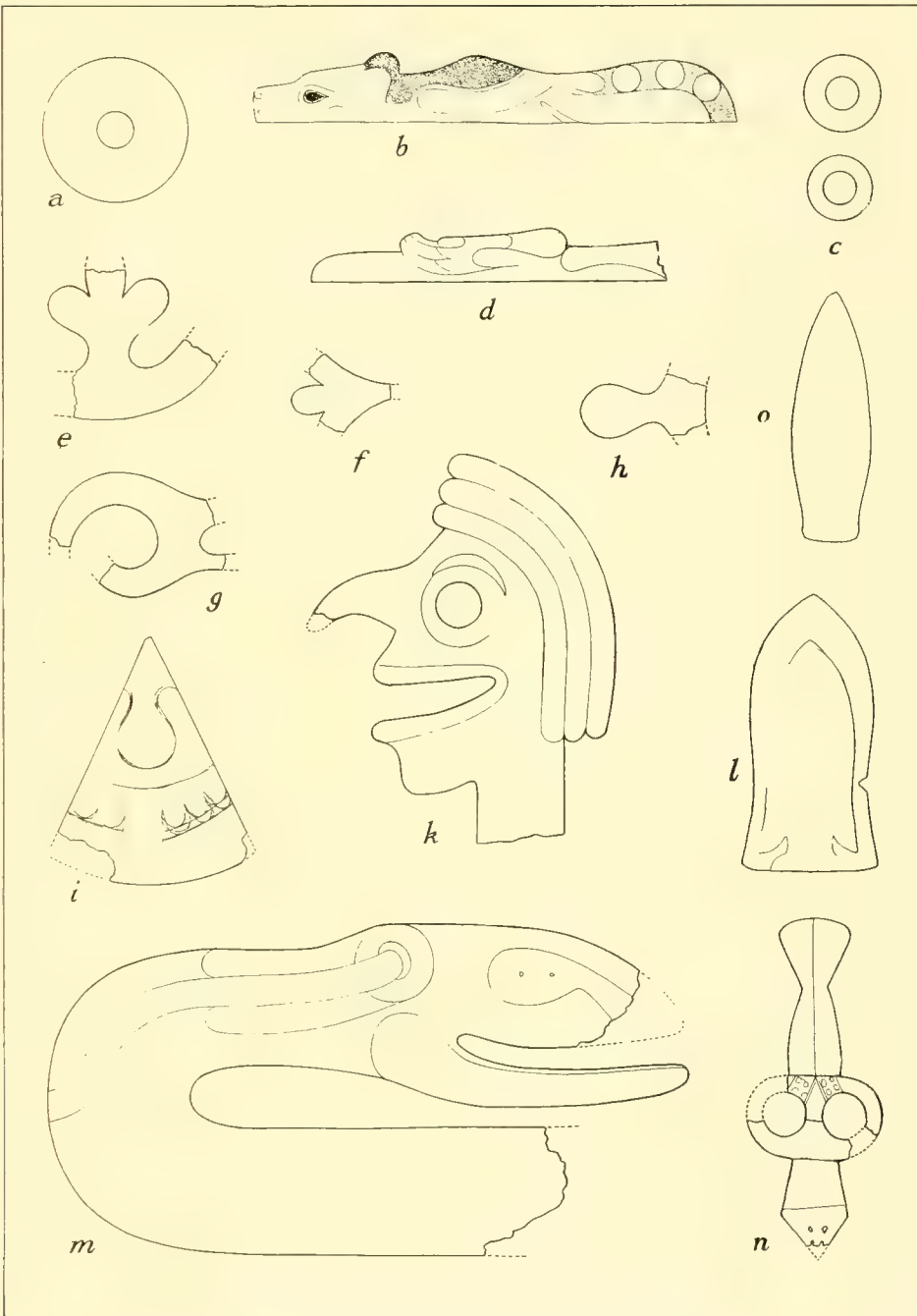
This carving probably represents the head of a Snake priest, for a portion of the rattle of a serpent appears just above the swastika at the back of the head. This becomes clear upon comparing the design with one of the rattles in the tail of the conventionalized serpent shown in *i*, and also with that of the serpent monster illustrated in plate XI, *h*. The swastika, which in this instance is apparently a wind symbol, adds to the probability of this interpretation. The design upon the face doubtless represents facial painting. This is shown developed in *h*.

HOLLOW EFFIGIES

Plate XI shows a class of objects from the tumuli, the use of which is unknown. They are all hollow, and most of them are pierced by one or more holes. The walls of some of them are very thin, and considerable skill must have been required in their making.

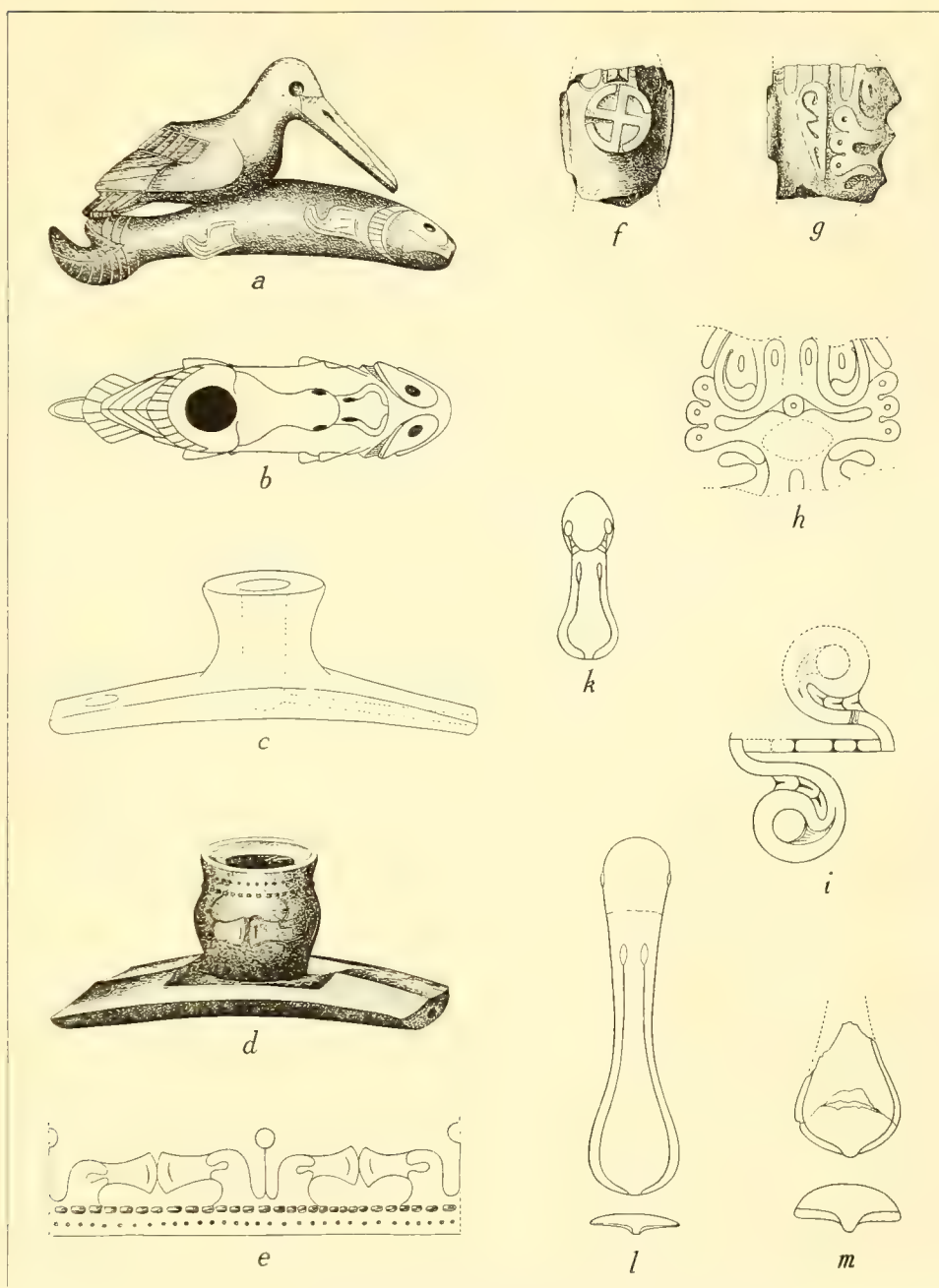
An eared owl is represented in *a*. The notched beak, the ears which project upward over the eye, and the outline of the ruff extending backward and downward from the eye, are all characteristics of this bird. This is made of a stone resembling serpentine, and like most objects of this class is finely executed. Two other birds carved from antler are shown in *d* and *f*. The notched beaks seem to indicate that they were intended to represent hawks. The first was found upon an altar, and the second accompanied a burial in the great mound of the Hopewell group. The tadpole-like object (*c*) is made of serpentine; a part of a pearl still remains in the eye. It is probable that all of these effigies once had pearls inserted in their eye cavities.

The beetle illustrated in *b* is carved in light-colored calcite and was taken from the group of mounds at Grand Rapids before referred to. What is perhaps the head of a doe is shown in *e*. This was obtained by Squier and Davis, and the drawing is from a cast in the Peabody Museum at Cambridge.



MICA OBJECTS FROM THE OHIO MOUNDS

b, Upper portion of bear painted in colors; *e-h*, Fragments of designs of the same character as shown upon plate II; *l, o*, are in the form of flint knives or spear-points; *m*, Horned serpent; *n*, Copy of atlatl, or spear-thrower.



PIPES AND OTHER CARVINGS FROM THE MOUNDS

a, b, d, e, k, Pipes from the Hopewell group; *c*, From mound in Michigan; *f, g*, Broken pipe from the Liberty group; *h*, Design upon face of *f, g*; *i*, Developed serpent design upon stone ball from the Liberty group; *j*, Head and beak of roseate spoonbill drawn from life; *m*, Beak of spoonbill carved in ivory, Hopewell group. (About $\frac{1}{2}$)

WILLOUGHBY—ART OF EARTHWORK BUILDERS

One of the most interesting effigies of this class is represented in *g, h, i*. This is carved in red slate and was taken from an altar of a mound of the Turner group. It was broken in many pieces, nearly all of which were recovered. This probably represents a mythical water monster analogous to those occurring in the mythology of the Pawnee and other tribes. It has the tail and head of the serpent. The plates of the serpent's head are shown above and below, and the four horns characteristic of the serpent deity north of Mexico are present. Two of the horns are carved in relief upon the top of the head, and two are made separately and inserted into holes drilled in each side. Like most effigies of this class, it is hollow, but the walls are not perforated.

STONE RINGS

The beautifully formed stone rings shown on plate XII, *a, c, d*, and in cross-section in figure 2, are among the most interesting objects recovered from the Ohio mounds. Similar rings were found by Squier and Davis and others. Those illustrated were taken, with fragments of others, from the altars of the Hopewell group.

These are probably ear-plugs.

Some of them are perforated laterally with four or eight holes as shown in the side views, *c* and *d*. It is not improbable that these perforations were for attaching feathers or other ornaments placed within or hanging from the central opening of the ring. Most of these are made from the brown micaceous mineral called "gold stone" by Squier and Davis, and are beautifully polished.

The most remarkable thing about them, however, is their symmetry. Their outlines form true circles and their surfaces are perfectly symmetrical. They could not have been made without some mechanical device based upon the lathe principle. The only other evidences of the use of the principle of the lathe by this people that I have been able to find is shown by a beautifully finished perforated disc of fossil ivory from a mound in Indiana and by certain shell beads that are altogether too symmetrical to have been made by any other known process. The fourth ring shown in the plate, *b*, was made by the writer from a piece of slate. The only implements used were stones such as may be picked up on almost any field, and two or three rude chipped knives. After roughly forming and perforating the slate disc, a stick about six inches long was fitted tightly in the



FIG. 2.—Cross-sections and rings on plate XII, *a, c, d*.

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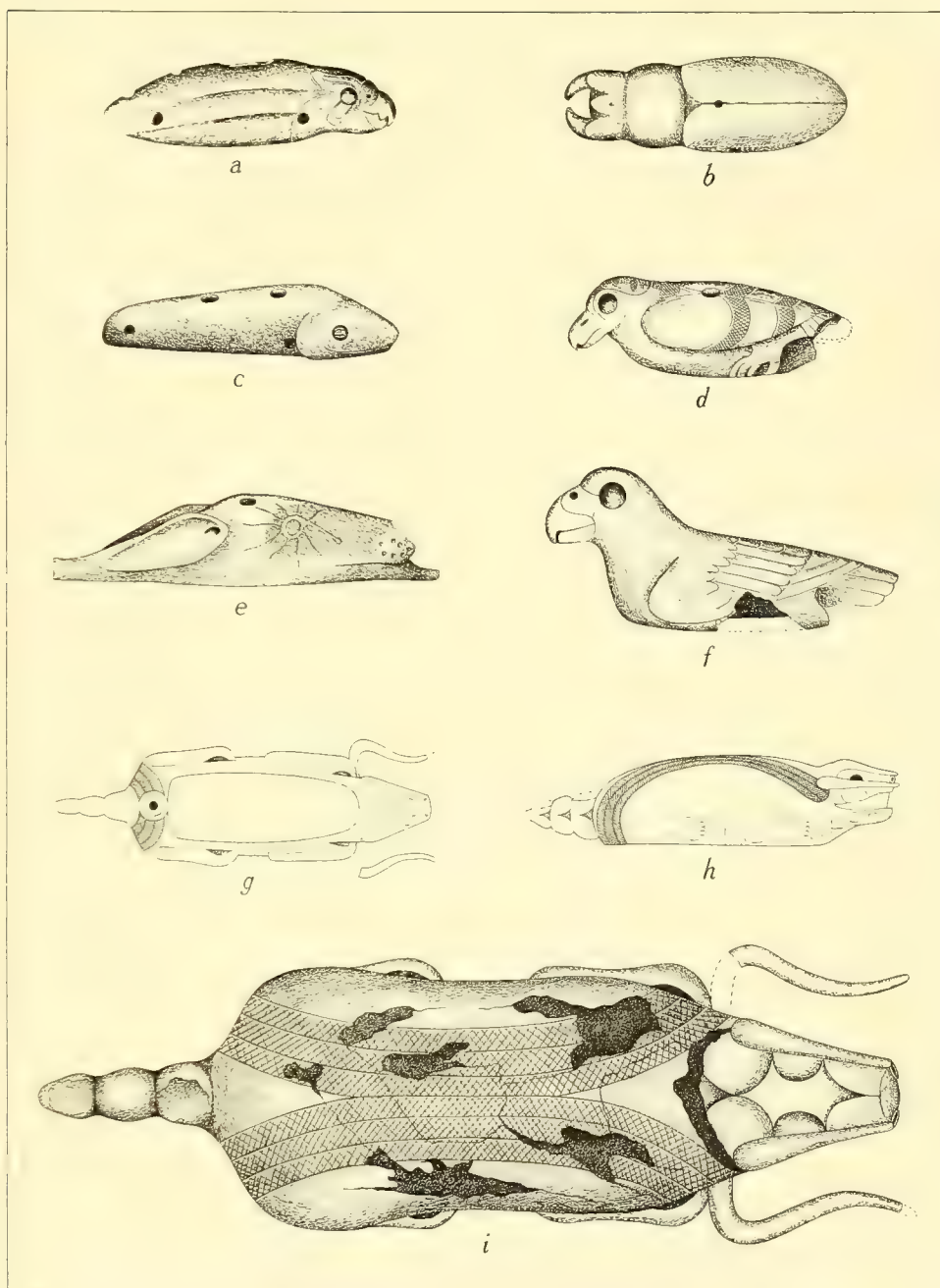
perforation and its ends rounded and hardened in the fire. The stick was then placed between two adjoining limbs of a tree, its ends being inserted in depressions cut into the limbs. With the aid of an improvised bow, the stick bearing the ring was revolved back and forth, and the ring finished by the use of the stone knives held against a cross-bar. Sand, water, and ashes were used for polishing. The above device formed, of course, a rude lathe, but it was merely the adaptation of the bow-drill which was known to the Eskimo and some other American tribes in prehistoric times.

TEXTILE FABRICS

The textile fabrics of this people did not differ materially from those of many other tribes of the United States. They appear to be principally of the twined-woven variety which was so widespread among people who had not adopted the loom. Many fragments of this cloth have been preserved by contact with metal objects, or have been found charred on the altars, or with cremated human remains. Some of this cloth is of a remarkably fine texture, for weaving done principally with the fingers unaided by mechanical devices.

Plate XIII, *a-c*, shows small sections of twined-woven cloth at the right, at the left enlarged drawings of each which illustrate more clearly the relation of the warp and woof cords. Other examples of this weaving are shown in *g-i*. The wave-like arrangement of the warp cords in *i* is very unusual. The twined woof cords in all of the above specimens are relatively like those shown in the sectional sketch in *i*. In *f* we have an example of the simple in-and-out weave; this is probably a piece of the upper portion of a bag. This type of weaving was sometimes followed in this region in making much finer cloth. What appear to be fragments of netted bags are illustrated at the right in *d* and *e*. Enlarged drawings appear at the left, showing the stitch. This type of netting is found among the northern Athapascans, in California, in the Pueblo region, and in northern Mexico, but is rare in other sections north of Mexico.

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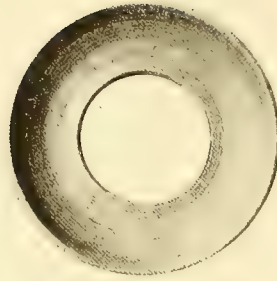


HOLLOW EFFIGIES FROM THE MOUNDS

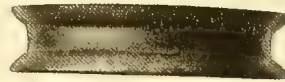
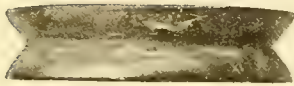
a, c, d, f, From the Hopewell group; *b*, From a mound in Michigan; *i*, From the Turner group;
g, h, Two views of *i*, reduced. (About $\frac{1}{2}$)



a



b



c

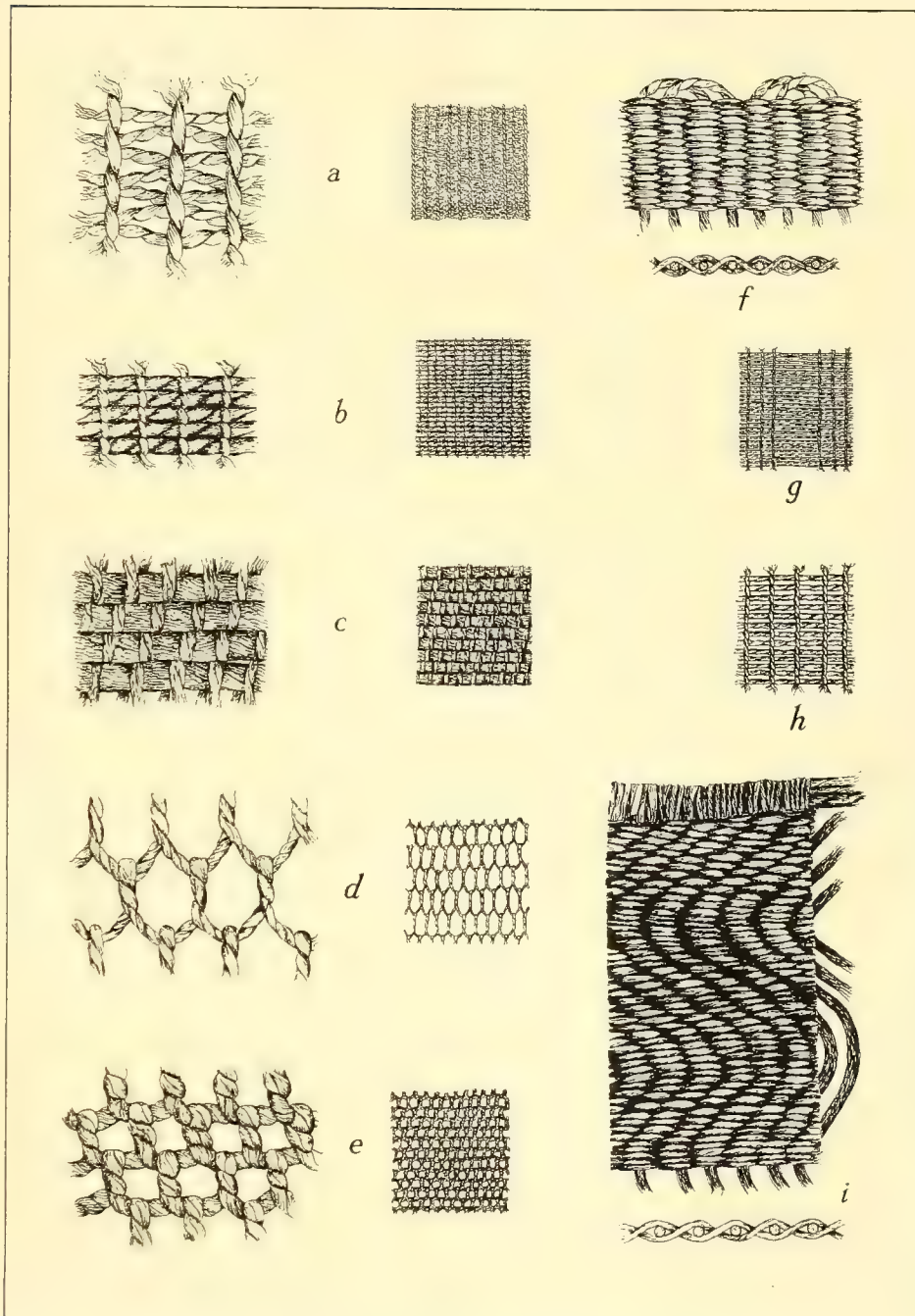


d



STONE RINGS

a, c, d, From the Hopewell group of mounds; *b*, Made with primitive tools by the author.
(About $\frac{2}{3}$)



TEXTILE FABRICS FROM THE HOPEWELL GROUP, OHIO

a-c, g-i, Twined weaving; *f*, In-and-out weaving; *d, e*, Netting. (Drawings at the left, *a-e*, are enlarged; all others about $\frac{1}{5}$)

Correlations between Archeological and Culture Areas in the American Continents

By CLARK WISSLER



IN a recent paper¹ Professor Holmes gives us a definite statement of the archeological areas in North America based on a comparative study of the artifacts so far collected. These are indicated on a distribution sketch map which we reproduce here. At about the same time the writer presented a map sketching the generally recognized culture areas for the historic tribes of the United States and Canada. The latter was based almost wholly on material culture data and should therefore be quite comparable to the archeological distribution.

A mere glance at these two maps shows a close correlation. In fact, the agreement is practically absolute except for eastern United States. All this has been remarked before, but its significance should not be overlooked. We must conclude that unless new data come to light, the antecedents of the historic cultures localized in these areas were from the start the initial and only cultures existing there and that their development has been merely an expansion along their original lines. The apparent *a priori* improbability of this is no doubt responsible for the extreme skepticism it usually elicits, but the plain facts of correlation cited above make clear that we are here facing one of the most important problems in the anthropology of the New World.

Returning to the comparison of our two maps, we note upon closer inspection a few points of difference. Thus, in eastern North America where the culture-area map shows but two divisions, the archeological map presents four. This divergence is sometimes cited as indicative of great changes in the distribution of population, but if the Iroquois were withdrawn and placed in the south whence they seem to have come recently, the mound peoples of Ohio reinstated, and the extinct Florida tribes revived, we should have a close agreement between the two maps. Then if we carry our analysis a little farther, we may

¹ *American Anthropologist*, vol. 16, no. 3, July-Sept. 1914.

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note the existence of reasons for regarding the mound culture north of the Ohio river as an intrusion from the south, and also the general distribution of the so-called problematic artifacts, such as banner-stones, bird-stones, etc., over Area IV and the corresponding half of Area I. The dissociation of the latter from the mounds was recognized long ago, and, curiously enough, their distribution agrees with the historic culture area. Thus, it seems that the chances favor there having for long been a tendency toward three culture areas in eastern United States: the northern, the southern, and the peninsula-gulf coast.

In a previous paper, the writer showed that the greater part of eastern Canada, when considered from the standpoint of material culture only, was continuous with the Déné area, which would bring it in close agreement with the archeological Area XI.

Hence, we see that even in this exceptional region there is no sharp disagreement between the two classifications.

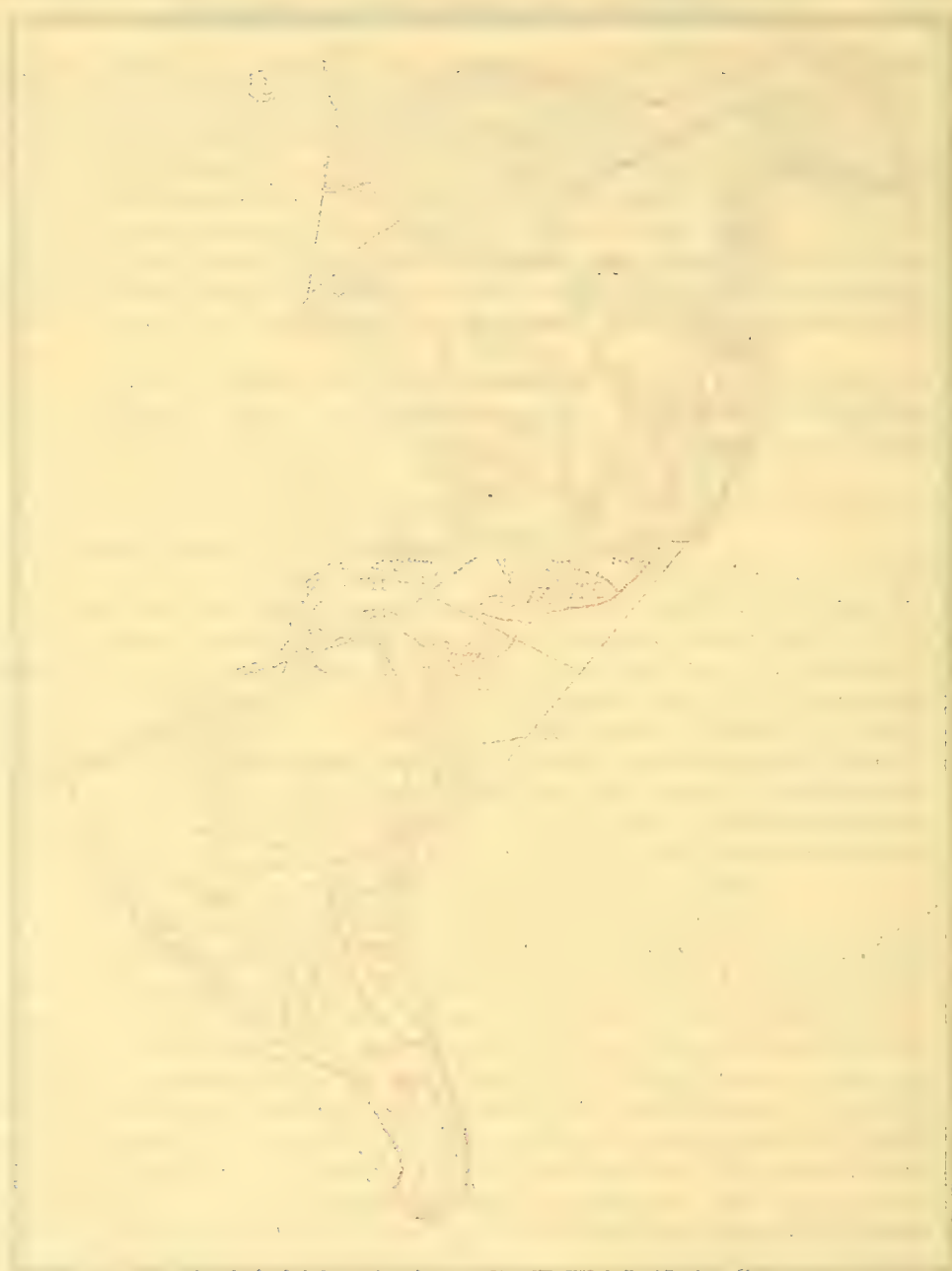
No culture-area maps for South America have yet come to our notice and the time has scarcely arrived for attempting one, but the artifacts in our museums suggest six archeological areas as we have indicated on the accompanying map: I, Colombia; II, Ecuador; III, Peru; IV, Chile; V, the Atlantic Highlands; and VI, Patagonia. There remains a space in the heart of the tropical forests for which we have no data and where the geographical conditions are unfavorable to its accumulation. These areas have the same characteristics as those of the Northern Continent, for they can be subdivided into two or more centers of differentiation, yet in each case there are several common traits uniting all localities within the same area.

If now we take these archeological areas as representing the pre-historic culture classification of the Southern Continent, we note again a close correspondence with the culture areas of the historic period. Areas I, II, III, and IV agree closely with the cultural relations at the Spanish conquest, and that a sense of this distinction survives to this day is indicated by the fact that each of these areas became an independent nation when Spanish control was withdrawn. Area VI was the home of the great hunting tribes, the only one in South America in which the wearing of skin clothing and the use of skin tents remind us of the northern hunting cultures. Into the greater part of this area the horse and the wild ox were introduced and soon entered into the culture of the natives.

While there are great cultural differences among the tribes in Area V, there are still important similarities. Agriculture and the making of pottery are features of all. Cassava was raised wherever



ARCHEOLOGICAL (RED) AND ETHNOLOGICAL (BLACK)
AREAS IN THE NEW WORLD



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WISSLER—ARCHEOLOGICAL AND CULTURE AREAS

possible, and some maize, tobacco, and cotton. There was also some weaving, particularly of hammocks.

As to the interior of the Amazon country, we have poor data, but what we have suggest that the whole should be apportioned among the surrounding contiguous areas, whose cultures seem to fade out to vacuity as one goes farther and farther into the wilds.

Thus, on both continents there is a very close general agreement between the localities occupied by the historic cultures and the archeological areas.

The reader is no doubt quite familiar with the idea of no correlations between culture and linguistic type, which is regarded as a kind of truism. But when we look carefully into the case it is not clear that every kind of correlation is absent. Our attention so far has been fixed on the conventional stock grouping, but it is now becoming clear that this is not the only possible classification. In California, positive similarities between a large number of stocks have been worked out and a new grouping proposed. Thus Kroeber and Dixon consider the five stocks Copehan (Wintun), Pujunan (Maidu), Mariposan (Yokuts), Moquelumnan (Miwok), and Costanoan, occupying the greater part of the typical central area, to be genetically related and hence as constituting a single stock. While there is a conservative disposition on the part of others to hold to the Powell stocks in this and all other cases, it is conceded that these California languages are members of *a* group. Likewise, there is a similarity between some of the languages of the North Pacific area, and some students are beginning to recognize common bonds between the languages of the lower Mississippi. Lehmann has called attention to striking similarities between the accepted stocks of Central America. In all this there appears **a** definite tendency for languages to correlate in some ways with the culture grouping. Yet this correlation may be an expression of tribal contact rather than genetic relationship in speech.

It is scarcely necessary to go into a discussion of the limitations and exceptions, because these have been commented upon by linguistic students. The mere mention of one or two points will suffice. Thus, it is conceded that language resists change more effectually than culture, and that the presence of different stocks in a culture area presupposes a migration on the part of one or the other. For example, we find the Algonkin stock represented in five of our archeological areas and possibly in a sixth (California). The only possible conclusion is that these culture differences were developed after the dispersion, whereas the language survived.

Such widely dispersed stocks give us a chance to compare degrees

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of divergence. If we take Michelson's classification of Algonkin languages we find that his Eastern group (Micmac, Malecite, etc.) occupied archeological Area I, while the Central group (Ojibway, Shawnee, Menomini, etc.) occupied a large part of Area IV. In Area V we find the mutually divergent languages spoken by Blackfoot, Cheyenne, and Arapaho, all of which seem to be farther apart than the two preceding groups. Now, if we consider culture areas only, we have a curious correspondence between the relative degrees of linguistic divergence and culture difference. Thus, the cultures of the Central and Eastern groups seem to have far more in common than have they with the Plains group. Further, if we admit Sapir's classification of Wiyot we have a still greater divergence both in language and culture. In this connection it is interesting to note that by a detailed analysis of Area I, Dixon finds a close agreement between archeological, culture, and dialectic sub-area, particularly in New England. Yet, the peculiarity of the Plains group must not be overlooked, for here we have three languages, Blackfoot, Arapaho, and Cheyenne, which are very divergent from each other but between whose cultures there are many close similarities.

Again, if we take the Siouan stock we have the following divisions: Dakota, Assiniboin, Dhegiha, Chiwere, Mandan, Hidatsa-Crow, Biloxi-Ofo, and Catawba. Here also we find that of the two scattered groups the Biloxi appear less divergent than the Catawba, but it does not appear that one is farther removed culturally than the other. The main body is rather compact and each of the five linguistic divisions comprises contiguous tribes, but as a whole shows a tendency to correlate with cultural differences. The exceptions are the Hidatsa and Crow, the former being very like the Mandan.

Thus, when we attempt to correlate the degrees of convergence, we get somewhat contradictory results, but the exceptions fall largely in the Plains area, while Areas I, III, IV, VII, VIII, IX, X, and XI, each show more or less inter-area linguistic similarities. As Dr Sapir has contended in his recent discussion of "Time Perspective in Aboriginal American Culture," there is more often some kind of an agreement than not. Finally, the curious similarities that have been noted among the stocks within recognized geographical areas, suggest that languages have a grouping similar to and largely coincident with the culture grouping. This similarity may or may not be the result of genetic relations, but only of long social contact. Our point is that the languages of a culture area, even when regarded as of independent stocks, still show a grouping that tends to be coincident with that for cultural characters. It is a reasonable expectation that a

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distribution of phonetic types alone would show a similar correspondence.

There is still another aspect of correlation. Each culture area tends to contain one large dominating stock. If we refer to Powell's linguistic map, Swanton and Thomas's map for Mexico and Central America, and the archeological map of Holmes, and also compare Chamberlain's linguistic map of South America with the archeological map accompanying this article, we find that this principle far more often holds than not. The peculiar point, is, however, that the unity is in the stock affiliation and not in practical speech, for the linguistic differentiation within a stock is often very great. Neither is there political unity, and it may be doubted if one of these can long exist without the other. The suggestion is, therefore, that the similarities of languages within a geographical or a culture area are due to the expansion of the early parent stocks within their habitats and to the long association made possible thereby.

We may now turn to the somatic classification of American aborigines. Again we have a truism that no correlations are to be found with culture and language. Unfortunately, no one has mapped out the somatic characters of our subject or even prepared a concise statement of their distribution. In consequence, we cannot make a definite comparison. Yet, some points can be cited. In the Eskimo we have almost an identity of somatic type and culture, and archeological investigations in Greenland and Alaska have so far revealed no predecessors. In reviewing the somatic characters of the Canadian Indians, Boas has differentiated a North Pacific type (Area IX) and a Plateau type (Area VIII). While it is true that each of these large groups can be subdivided and are far less homogeneous than the Eskimo, they are nevertheless real groups and in so far correlate with the cultural classification. Dr Hrdlička has investigated two of our areas, California (VII) and the North Atlantic (I). By comparing the skeletons from burials recent and otherwise, this investigator concludes that one and only one type is found in each area. Without enumerating some less definite determinations that have been made for other areas, we may safely say that there is here also a clear tendency for somatic type to correlate with culture areas. On the other hand, many characters, as stature and cephalic index, seem to be distributed rather differently than culture, thus giving a relation not unlike that we have noted among widely scattered language groups.

It is clear that if Dr Hrdlička's conclusions for California and the

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North Atlantic area hold, we must consider that the population here has been stable for a very long time. In California this must mean that the greater part of the people speaking the different linguistic stocks had a common origin, as in fact some investigators now claim the languages themselves show.

In a former paper the writer analyzed the distribution of culture areas, showing how they tended to resolve themselves into culture centers around which were intermediate types. It would be interesting to make this experiment for the archeological areas also. The only discussion bearing directly on this point is Kroeber's summary for California,¹ where it appears that the same subdivisions are found in archeological data as in the culture of the historic period. In like manner, Dixon, in reviewing the migrations of the Indians of New England, divides the northern half of Area I into three provinces or centers, as indicated by the distribution of archeological artifacts alone.² These localizations are then shown to correspond to differences among the historic tribes both in culture and language. The suggestion here is that if we had the data, centers of archeological distribution could be located analogous to the trait centers noted in the historic period. That such centers have not been worked out is due to the complexity of the problem which arises from two conditions. In the first place, there are no convenient tribal units in archeology so that each successive minute geographical area must be checked over, and secondly, there must be some confusion in these units due to chronological differences. We must be prepared, therefore, for far less regularity and consistency than we find in historic culture until by the development of chronological distinctions we are able to separate the diverse elements into their respective strata.

Since some anthropologists look askance at any serious attempt to define culture areas, we may offer a few points in justification. In the first place these critics go on talking of North Pacific Coast culture, Plains culture, Plateau culture, etc., even when denying the validity of the classification. Some take the extreme view that any kind of a classification not based on chronology is vicious. I think a little reflection will show that these objections arise from inadequate understanding of the principles of classification. In the first place, the culture area map is a classification of the traits found among the living tribes and belongs therefore to one definite chronological period. It represents the cultures practised during the historic period. It is

¹A. L. Kroeber, *The Archaeology of California, Putnam Anniversary Volume*, 1909.

²R. B. Dixon, *The Early Migrations of the Indians of New England and the Maritime Provinces, Proceedings of the American Antiquarian Society*, vol. 24, pt. 1, 1914.

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merely a classification of data from observation. Just how it could be broken up into chronological units when all the observations belong to the same relatively short period of time, we do not see. It is in fact a chronological classification and postdates the archeological classification, for Holmes' map can scarcely be taken as belonging to anything else than the time period antedating the discovery of America. We have then two cultural strata, the distinction between which can be clearly drawn.

It is further contended that the culture area obscures the chronological relations of traits in a center, but these critics are interested in the analysis of each culture into its constituent trait elements and the assigning of time relations to the same. Yet in all such cases we must have a point of departure in the historic period, from which to work backward. Further, such a relative chronology of traits is largely a matter of inference from the data and for that reason could not of itself serve as the basis for a satisfactory classification, since the bed-rock to which we must always return will be the observed cultures of the historic tribes and their geographical distributions.

The archeological distribution area as defined by Holmes is an objective affair arrived at by the tabulation of artifacts and their localities. This is the first rational step toward the chronological problems involved and has about the same relation to the time connections between the several classes of artifacts as pertains to the traits of a historic culture. Hence we fail to see the justification for the objections to the use of distribution areas. If the chronology of the future is able to show that certain traits in the North Pacific area, for instance, were developed very late in its history and that certain others were brought in at the start, these facts of history do not effect the observed existence of all simultaneously in the historic period, which is expressed in the culture area concept. Also, in archeology unless new types of artifacts are discovered in a given area, the determination of chronology by stratigraphic strategy will not destroy or render useless the original grouping, for it still expresses the geographical relation, the most readily verifiable series of facts in the subject. Further, a strictly geographical classification is about as free from theoretical biases as anything we have, certainly much more so than inferential chronology.

In conclusion, we have in the culture areas of the historic tribes and the accepted archeological areas, two chronological groups of culture data. The former is absolutely essential as the point of departure since for it we give a date. The designation of archeological areas is also a necessary step, for it is the unbiased preliminary layout

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of the available data. The striking agreement between culture and artifact areas cannot be due merely to one being continuous with the other, but must signify that cultures were scarcely ever moved from their habitats. Languages seem to have traveled more, but the suggestion is that the somatic type was stable, or at least able to submerge all intruders. According to this interpretation, cultures, somatic types, and to a considerable extent languages as well, grew up in single geographical areas, a condition giving us a kind of accidental correlation. We say accidental because there are no observable reasons why specific types of culture should accompany certain types of language or anatomy. What we seem to have is a tendency toward identity within each definite geographical area, strongly marked in case of culture, far less noticeable in language, but still in evidence. Thus, the explanation for each specific case of correlation is to be sought in historical data.

Returning now from this digression to our main consideration, the correlation of prehistoric and historic culture areas, one is first of all puzzled that there should be such close agreement between them because the traditions of our subject call for a veritable and constant flux of migrations. While it is now apparent that migration is exceptional rather than universal, still the logical necessities of the case require it. One can scarcely conceive of the peopling of the New World except by the expansion and spread of its population gradually from one area to another. It may be, however, that this is not the important point here. Thus, when we consider the best known or most probable cases of migration, they all seem to have one common character, since they are circumscribed movements in a single area. For example, the Eskimo, whose first appearance in the New World must have been in Alaska, spread only along the Arctic coast-belt to its ultimate limits. Yet, since they are the sole possessors of this territory, they offer a far less suggestive example than can be found elsewhere. We now have satisfactory data for the northern movement of the Iroquois, but if we superimpose the Powell map and one showing topography, we see clearly that whichever way the tribes of Iroquoian stock moved, they kept close to the Atlantic highlands. On the other hand, the Algonkins expanded in lands of less elevation, 500 to 2000 feet, but chiefly in a wooded lake and portage region. In like manner we may follow out the Siouan, Athapaskan, Salish, Muskogean, Shoshonean, Mayan, Arawak, Carib, and other stocks. It cannot be an accident that all the Muskogean peoples lived at an elevation less than 500, that the Algonkin were with few exceptions between 500 and 2000, that the Athapascans are chiefly in land be-

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tween 2000 and 5000, while the Shoshoni-Nahuatl stock occupies land above 5000. Then if we turn from linguistic to culture characters, we find similar agreements. Southeastern culture is below 500 feet, the Eastern Woodland area is in the main from 500 to 2000, the Nahua area above 5000, as was also the home of Inca culture.

It is also suggestive to take the topographical map as our point of departure and compare the cultures of the different sections. Thus, the Algonkins of the Atlantic coast-plain from Maine southward are below 500 feet, or on a level with the Muskogean group, and it is just here that we find certain northern traces of Southeastern culture. In the Mississippi valley these same lowlands reach up to the Ohio and the Missouri, and here also we find the margin of Southeastern traits. The two types of culture we find in the Bison area, the western and the eastern, line up along the north and south divide of 2000 feet. Further, it is distinctly among the eastern tribes that we find Eastern Woodland traits, the elevation of both being below 2000 feet.

These few illustrations must suffice, but the reader can follow out others by referring to suitable maps. We are not contending for a direct correlation between elevation and culture, for the numerals we have used are but convenient geographical indices to climatic, faunal, and floral areas. As boundaries, they are just as arbitrarily chosen as those for culture areas, but for that very reason should be strictly comparable. The fact that they do then so correspond cannot be dismissed as a logical error. We are thus brought to the conclusion that the phenomena of our subject manifest a strong tendency to expand to the limits of the geographical area in which they arise and no farther. Language seems to spill over the edges far more readily than culture, from which we must infer that linguistic dispersion is a by-product of migration; but these migratory linguistic groups seem unable to resist complete cultural assimilation.

The carrying of a culture into a new area and maintaining it entire, is a correlate of organized governments. We see in the Inca and Aztec areas the working of this factor. Outside of these areas there were no such organizations, only small independent groups.

From this point of view it is conceivable that the Muskogean and Algonkin stocks, for instance, could have exchanged habitats without changing the cultures localized within the two areas, provided the shifting was by successive small units; or that all the Shoshonean peoples could have become Pueblos like the Hopi and the Keresan, and other stocks have scattered out on the plateaus to the north, while the culture values of the two areas remained relatively the same. That such extreme transpositions ever occurred is, of course,

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improbable, but their possibility is demonstrated in the Plains and particularly in the Pueblo area itself. Such an interpretation would be consistent with the facts we have cited in this paper. There is thus no *a priori* improbability for the assumption that the first tribes in the Columbia basin, for instance, did not speak Salish.

Yet the real problem in the case remains unsolved. What became of the culture brought into an area by the first settlers? That the new environment was harsh enough to stamp it out promptly is beyond belief. The idea that all initial cultures were uniformly simple at the first dispersion is equally unsatisfactory. No doubt part of our trouble arises from the fact that we are dealing with the northern part of the New World. If we had fuller knowledge of Mexico, for example, it may be expected that different underlying cultures would come to light. It is impossible to guess what insight will thus be gained into the early history of the Americas. But waiving this question of initial origin, we conclude that the environment is an important determining factor in the correlations we have noted.

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